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COMPUTER TRADER MAGAZINE

For Computerist And Amateur Radio...

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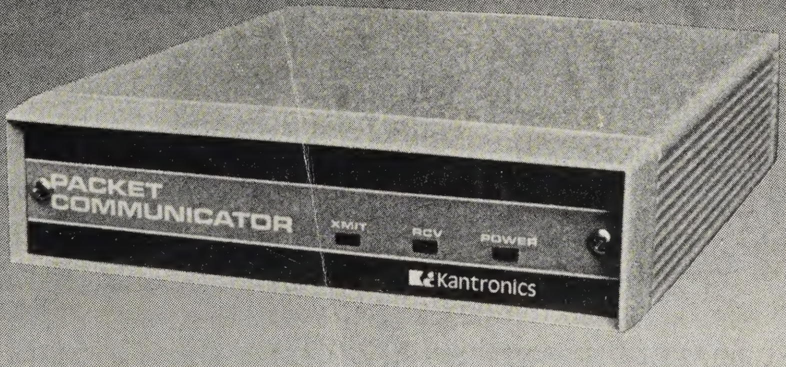
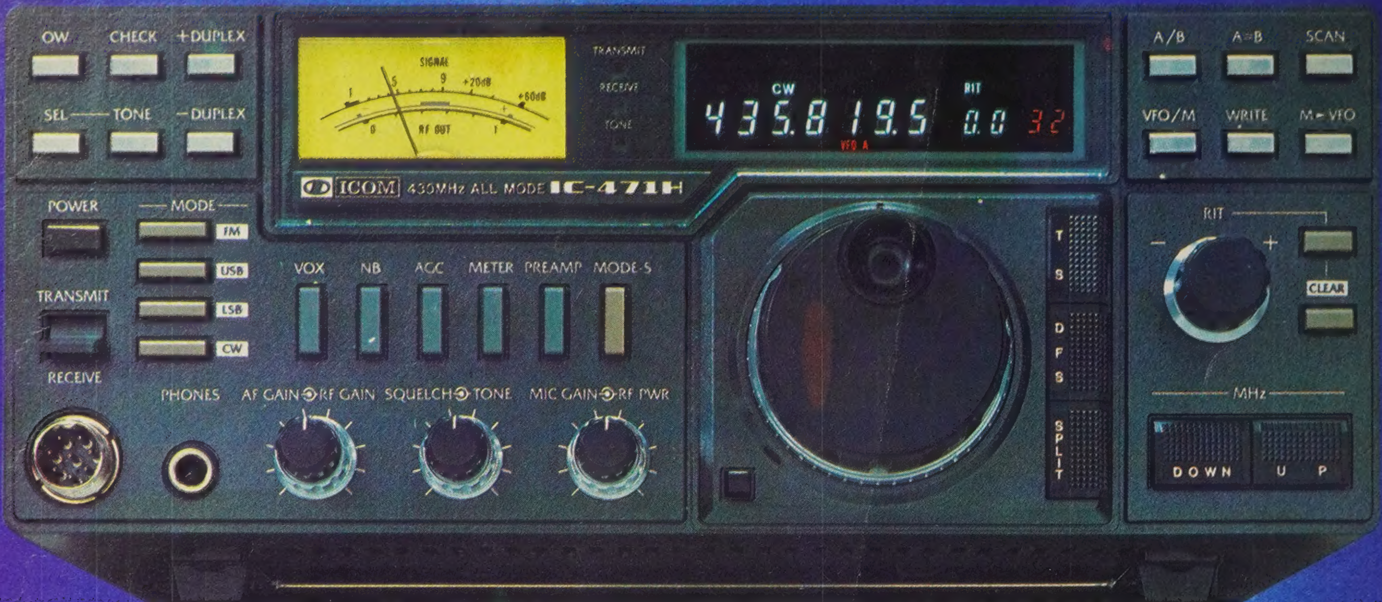


Kantronics

PACKET COMMUNICATOR

ICOM UHF Transceiver

IC-471H



For Maximum UHF Base Station Performance

Whether your interest is simplex, repeater operation, or satellite work, the IC-471H 430-450MHz base station transceiver will give you maximum UHF operation.

75 Watts. The IC-471H provides 10 to 75 watts of adjustable power in all modes. This enables adjusting the drive level to a linear amplifier for higher power uses such as moonbounce. For a portable UHF station, the optional IC-PS35 internal power supply is available.

IC-471H With IC-PS35 Internal Power Supply Installed

Compare these exceptional Standard Features:

- 430 – 450MHz
- Variable tuning steps, FM 5KHz and 1 KHz; SSB 10Hz, 50Hz and 1KHz
- 32 full-function Memories with lithium battery backup
- 75 Watts, fully adjustable on all modes
- 32 built-in Subaudible Tones
- High visibility display
- Scanning systems... Memories, Modes or Programmable Band
- RIT/XIT with separate readout
- S-Meter and Center Meter
- IC-HM12 Microphone with Up/Down Scan
- 11¼"W x 4⅜"H x 12⅝"D

Optional Features. AG-35 switchable mast-mounted GaAsFET preamp, UT-15S CTCSS encoder/decoder (encoder is standard), IC-EX310 voice synthesizer, IC-SM8 two-cable desk mic and IC-SM6 desk mic. PLUS a variety of power supplies...the IC-PS35 internal power supply, the IC-PS30 system power supply or the IC-PS15 external power supply.

AG-35 Mast Mounted GaAsFET Preamplifier

The IC-471A. The 25 watt IC-471A is also available and has the same outstanding features as the IC-471H, plus an optional IC-PS25 internal power supply for portable operation.

To complete your VHF/UHF base station, the IC-471's 2-meter companions, the 100 watt IC-271H and the 25 watt IC-271A are also available.

IC-PS30 Power Supply

See the IC-471H and other ICOM equipment at your local authorized ICOM dealer.

ICOM

First in Communications

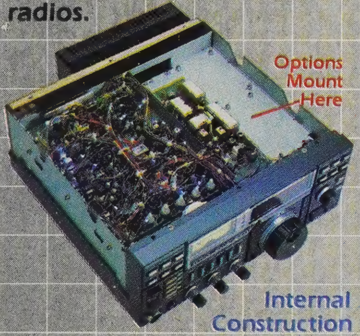
ICOM America, Inc., 2380-116th Ave NE, Bellevue, WA 98004 / 3331 Towerwood Drive, Suite 307, Dallas, TX 75234

All stated specifications are approximate and subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions. 471H1084

ICOM VHF Transceiver IC-271H

The Versatile 100 Watt 2 Meter Base System

For the ultimate in 2-meter communications, ICOM presents the IC-271H transceiver with a high dynamic range receiver and a 100 watt transmitter...And all the advanced functions of the latest CPU controlled radios.



Internal Construction

IC-PS30 Power Supply

Exceptional Standard Features:

- 143.800 – 148.199MHz, expandable for MARS operation
- 32 full-function Memories with lithium battery backup
- 100 Watts, fully adjustable on all modes
- Variable Tuning Steps, FM 5KHz and 1KHz; SSB 10Hz, 50Hz and 1KHz
- 32 built-in Subaudible Tones
- High Visibility Display
- S-Meter and Center Meter
- Scanning Systems Memories, Modes and Programmable Band
- IC-HM12 Microphone with Up/Down Scan
- 11¼"W x 4⅜"H x 12⅝"D

Optional Features. AG-25 switchable preamp, UT-15S CTCSS encoder/decoder (encoder is standard), IC-EX310 voice synthesizer, IC-SM8 two-cable desk mic and IC-SM6 desk mic. PLUS a variety of power supplies... IC-PS30 system power supply, IC-PS15 external or IC-PS35 internal power supplies.

The IC-271A. The 25 watt IC-271A has the same outstanding featues as the IC-271H, including an internal power supply, IC-PS25.

IC-271H Shown with internal power supply, IC-PS35

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Seating will be limited for the Grand Banquet and Entertainment on Saturday evening so please make reservations early. Noted humorist Jean P. Sheperd, K2ORS, will return for his third appearance as Banquet Speaker. His presentation promises to be outstanding in an all new banquet program format.

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Nominations are requested for Radio Amateur of the Year, Special Achievement and Technical Excellence Awards. Nomination forms are available from Award Chairman, Box 44, Dayton, Ohio 45401 and must be returned by April 1, 1985.

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$8 in advance, $10 at door.
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BANQUET
$14 in advance, $16 at door.
FLEA MARKET SPACE
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Registration processing starts Jan. 1, 1985.

For special motel rates and reservations write to Hamvention Housing, Box 1288, Dayton, OH 45402. NO RESERVATIONS WILL BE ACCEPTED BY TELEPHONE.

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- $4.00 check or money order made payable to ARRL/VEC
- Completed 610 form with copy of license
- Indicate preferred sitting time: Sat. 9 a.m., Sat. 1 p.m., Sun. 9 a.m.

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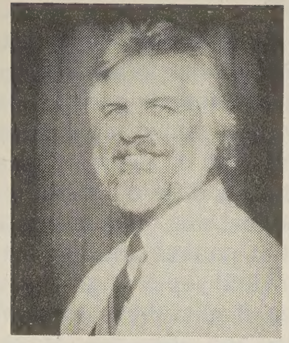
Chet's Computer Chats

(An Editorial and Just Plain Talk...)



Chet Lambert

Our Fourth Anniversary

It just doesn't seem like it should be four years since I started **Computer Trader** with the one sheet of paper...But it has! And Boy! what a change from the original. All I had intended was to have a trading paper like the "Yellow Sheets" like Brand, but no, that wasn't to be due to the encouragement, no, demand, of you subscribers. Much of the changes have directly involved you, our subscribers.

We started out with one sheet of green bond paper using a dot matrix printer and our largest and last issue on bond was just 16 pages. In February 1982 we went to newsprint and in July 1983 we made another big step and went to a hard enamle cover and we got our **first** 4-color ad. That was **ICOM of America**. Ms. Evelyn Garrison, Director of Marketing of ICOM made that decision and saw the potential of **CTM**. Also, at the same time we changed our name from **Computer Trader to Computer Trader Magazine** to distinguish us from being a broker of used equipment.

September 1984 issue had several **firsts**. It was our largest issue with 112 pages. It was our **first** issue with a 4-color cover and it was our **first** issue on enamel paper. It was also our **first** issue to have more than two 4-color ads...ICOM of American had four four-color ads. So thanks to Evelyn Garrison of ICOM, we were able to give you our subscribers several **firsts.** I am going to try something now and I hope I don't mess up. Other advertisers who have been with us for years and have been strong supporters of **CTM** are: **DoKay Computer Products** who gave us their first ad in December 1982 and are still with us. **Computer Supplies** started with us in January 1982 and still with us. **KSG Technologies** started in February 1982. **CQ Magazine** started in June 1982. **Micro Solutions Inc. started in June 1982. A5 Magazine now Spec-Com** started in October 1982. **Roebuck Typewriter Company** started in March 1983. **73 Magazine** started in March 1983. **CompuCover** started in April 1983. **Dental Computer Newsletter** started in April 1983. **The Computer Express** started in May 1983. **Hawg Wild Software** started in May 1983. **Computer Expositions** now **CompuShows** started in August 1983. **Broadway Software started in October 1983. Ham Radio Magazine** started in February 1984. **Popular Communications Magazine** started in April 1984.

I can't say at this time just where we will end. My goal is to make **CTM** the magazine "you can't live without" and you will want ALL of your friends to share in your joy. You can help by telling your friends just how great **CTM** is now and help us to reach that goal sooner.

These four years have really been tough; in getting started, in getting new subscribers, new advertisers and most of all money to reach the goals I have for us.

I thank those advertisers who have had faith in us and I sincerely hope your faith continues, because we are now on the path to new growth and I hope by our fifth anniversary we will have attained some of the goals. With your help, we will!!

A **SPECIAL THANKS** to our writers, if it were not for you I am afraid **CTM** wouldn't be where it is today. I would try to name you but if I left someone out, I would hurt feelings and I can't afford that.

Problems... Your Problems

As most of you know by now, I really had problems with the March/April issue. Let me take some time and explain the best I can just what happened.

It started in February when we had all the ice and snow here in Birmingham, I went to too many shows (for a short month that is) and last but not least, many of the writers didn't have their articles to me on time.

You know how much I love **CTM** and the way it has grown over the last four years from one page to the current size. A lot of work has gone into **CTM** and not just mine, the writers have contributed so very much time, energy and work into their articles and if it wasn't for them, we would have not grown as we have.

I left the raw magazine with the printers on March 4th, just a few days before we left for Orlando HamCation. I was in great hopes it would be ready for mail by the time I got back. I had hoped it would be ready March 12th and I would have it in the mail by the 13th. And, I would have copies to take to Charlotte to the Hamfest. No, it wasn't ready and I didn't get it until March 20th.

When I got back from Orlando and found it was going to be later, I made the decision to change the cover date. It wouldn't be FAIR to my advertisers to only give them less than two weeks before another issue would hit the streets. That was my main consideration. Also it would give me time to get the next (May) issue out.

Now, just what other reasons for the issue being late? It wasn't totally the fault of my normal printer, Central Publishing. They had equipment problems. They have a new 4-color web press and have had problems with it since it was installed. Last month wasn't any different. And, it was us, you and me that suffered. I was there and saw factory men working on it. That caused them them to get behind in their orders and yep, you got it, we got pushed back. Then, on top of all of these problems, after they finally got it printed and when they got ready for the stitching and trimming the stitcher broke down and they had to send our magazine to another company for the stitching and trimming. Argon Press, Bessemer, Alabama (a suburb of Birmingham) did it. They are the ones who didn't trim our magazine like it should be. They are the ones who didn't place the sections like they should be so one side went under the middle of the magazine so you couldn't read part of it. So all of the problems wasn't totally with my normal printers, Central Publishing.

I keep hoping and praying things will change so I won't have to worry so much in getting each issue out. And, won't have to work so hard. If I were triplets, all three of us would be overworked!!

Two Issues in One Month

This is the month (April) I have to get two issues out, totally... Why? Because the covers are sold for the Dayton HamVention. If I hadn't had problems in getting the March issue out, I wouldn't have any problems but since I did and I have the special covers to get out and such. I have to get two issues out in one month. Several other publishers don't understand how I get a 100+ page magazine out each month by myself and go to the number of shows I do, they just don't believe what I am able to do. But, they don't know how many hours go into each issue.

This issue should have been the April issue but as you can see it is the May issue. The June issue will be the ICOM issue and the July issue will be the KENWOOD issue. All three should have been at Dayton and they will be because I have to get out the two complete issues this month. I sure hope I can do it...

Its possible last months delay will be good for us

If I am able to get two issues out in one month, that will mean the next issue won't be until July. If that is true, then here is my plans, if I can carry them out, but it will take the help of all of our writers. I need several articles from each of you to do this but I think we can benefit from it. Heres my plan.

I hope to get the issue to the printers by the first of the month prior to the issue date, i.e., June 1st for the July issue. Hopefully I can have it back by mid-month and in the mail to you. That way, you should be getting it around the first of the month of the issue date. Thats the way it should be....

How did I do it?

I couldn't have done it without the help of a good friend and a new writer, Jim Pittman. I have known Jim for over five years but never realized he worked with computers and knew how to write. He does, in both catagories...

Jim re-keyboarded over fifteen articles from writers who didn't upload to the local BBS or sent me their articles on disk. He was/is a great help. As of this writing I don't know just how many of his own articles are in this issue. At least two and possibly more. I just don't know but you know if you just look at the contents page. I can't, it hasn't been printed....

Thanks Jim

Thanks Jim for your help in getting this and next months edition out on time for me to carry to Dayton. I hope "my words of the future" were correct. Only the next issue will tell...

Some Minor Problems with Canadian Subscriptions

I have many many subscribers in Canadian and I hope they enjoy reading **CTM**, evidently they do because I get many request for "sample" issues each month.

The problem comes in when I get a check for the "sample" or subscription in Canadian money. My bank won't accept these checks or Money Orders without a lot of problems. Also, when I get a Canadian check or money order for a "sample", sometimes they are using an older magazine that had sample copies for $2.50. The problem when my bank cashes a Canadian check, it costs me $2.00. Each issue costs me more than $.50 to cash and at minimum $.95 cents to mail since I can't send bulk mail like I do to you each month. I want the Canadian subscriptions but I can't afford it like it is going. When I raise my cost for a "sample" issue in Canadian, I hope you Canadians understand my problem. I wouldn't have this problem if you would only send me **U.S. FUNDS**.

Slowing Down on Going to Shows

As I told you in the November or December issue, I was going to have to slow down in going to shows, both, computer expos and hamfest. I still have to and have since the first of the year. I think you can tell from the above just what I am having to go through and I can't keep up this pace. I am not a young as I look and act.

I will choose my shows very carefully and hopefully, I will begin to feel better and will be able to put out a better quality magazine. I think you will understand.

Richard Driggers Bulletin Board

Our local BBS is going out of business here in Birmingham effective June 15, 1985. Richard is being transferred up to New Jersey where he will start the

CTM

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BBS up there. That is great for you subscribers in the New Jersey and New York area but it sure isn't for **CTM**. We were just getting to the point where we were comfortable with the board in having our writers to upload their articles and I could go in and download them. Now, I will have to look for other means.

Richard I sure do thank you for allowing my writers and me to use your board. It was a great help and I sincerely hope you will enjoy your new working environment.

IBM jr for CTM

I bought an IBM jr 128K computer while I was at the Orlando HamCation and have been able to use some of my IBM writers disk for inputting typesetting codes.

I am having problem in getting my "better" keyboard from IBM and I am now doing some research on just how to get it. I don't have all of my facts and you would be (or perhaps not) surprise how difficult it is to get something from IBM. So far, there support isn't what I thought it would be. But, there are several factors in this story but I won't go into them now. If any of you have had any problems in getting support from IBM with your computers and equipment, please let me know. I wonder if I am the "only" one having such a problem? I need you help and input to let me know.

Those of you who are able to write your articles on IBM PC, IBM PC jr, or compatibles just send me your articles on disk plus a hardcopy backup.

So now we are able to read IBM, CP/M and others. It sure is great when I don't have to sit at the keyboard and re-keyboard all of the great articles.

Amateur Radio Operators' Yearbook The AROY won't be. I had a call from Lee Roy Kent who was putting out this great endeavor and his financial backer backed out at the last moment. We, Lee Roy and I had worked hard on the yearbook and to be denied the publication at the "last minute" sure hit hard. Perhaps Lee Roy will find a new backer and will get the yearbook out sometime later. I am glad he hadn't accepted any money for the yearbook. That will help with the finances but it sure is hard to see a "dream" float away. May be later Lee Roy!!

When Writing CTM

When it is necessary for you to write us about your subscription or anything pertaining to you, please give us your ZIP code. We keep our mailing list on our Kaypro 10 by ZIP code. When we don't have that we have to do a search and that takes time and time is one important commodity, I don't have to waste. Another thing that would be most helpful is your phone number. If I have it, I may call and give you your answer immediately instead of mailing your answer.

Right now I have six articles on TRS-80 computers called "Origin" by Roger Smith but I can't use any of them. When he sent them to the local BBS, each of the articles got a "hit", I guess and parts of each of them are missing. I don't have a hard copy and I won't put the articles out until I know I have them correct. I have mailed a card and a letter to Roger for a hard copy but to date I don't have them. If I had his phone number I could call. I have called the local operator but evidently his number is unlisted or at least they can't locate a number.

I know may of you will be glad when I start running them. They are great informative articles on Radio Shack computers but we will just have to wait until I get all of the articles.

SUM Magazine?

I just got a copy of SUM Magazine from Florida. It is a magazine for the Timex Sinclair users. It has on the cover Volume III but I have never heard of it. Although they do mention **CTM** as a source of T/S information. It is 16 pages about half and half articles and display ads. It reminds me of **CTM** when we started.

You Timex Sinclair readers may enjoy getting this magazine which cost $12.00 a year for 12 issues. You can contact them at: SUM Magazine, 3224 Northwest 30th Ave. Gainesville, FL 32605. (904) 378-9000 evenings/weekends only.

Libraries

If you have a local library you might let them know of **CTM** and they may want to subscribe for their readers. I have many such subscribers.

I also have many school libraries as subscribers. Here again, if you attend school, let your school know and who knows I may get another library to get **CTM**.

I will give discounts to libraries for subscriptions.

Coming Events

The only coming event I am planning on attending in the near future is Dayton HamVention. Teenie and I will be there and will be looking forward in seeing those of you who we only see at Dayton. Our booth this year is on the main floor and is number 278. Come by and say "Howdy"!!

Recent Shows/Events

Orlando HamCation

Teenie, my wife and Christie, my daughter and I left for Orlando in great hopes of going to a great hamfest. We were not disappointed. It was a good hamfest.

I realize and I know you realize that any event like a hamfest isn't put on and together by one person and that is the way it is. But, I do have to recognize the hard work of Al and Sara Huber for the long and hard hours they put in on this great show. They had a lot of help from other club members as it is in most clubs but the results from this collective effort really paid off in Orlando.

I talked to most of the companies there and all were most pleased with the crowd size (over 10,000) and they made their expenses and some (the lucky ones) more than made expenses. It must have been good for them because when we went over to Al and Sara to tell them by, they had sold all but four booths for next year show and that was out of 98 booths. Not bad....!! We will be back!!

One area in which I am really interested was the RV parking area. There was quiet a bit of confusion on just where we could park our RV's. After the "final" rule was made, we or at least most of us moved over to the new RV parking area. There was room for more RV's but it was nearly full. I think there were between 80 and 100 various types of RV's.

The flea market had over 600 swap tables in use. It was large and there was only a small place left for expansion. However, the exhibition area for commercial dealers have some room they could move and then the flea market could enlarge into another area normally used by the commercial dealers. So there is still room for growth for the hamcation.

They are building a new hotel right next to the Expo Center and it is hoped it will be ready for occupancy by the time next years HamCation comes around. It will really help the Expo to be one of the better locations in the country for exhibitions. And, I hope the HamCation and Computer Show will be able to remain there for years to come. It is a GREAT location.

This year was good for **CTM**, we sold some subscription, got some new advertisers and got at least one new writer who is in this issue. Have promises of others.

One of the real nice things about this years show was that Teenie, Christie and I had the opportunity to get over to Disneys' Epcot Center. Boy! what a great place to go. We were there for most of the day, getting there about opening time. They sure do have some great things. I would love to get behind-the scenes and find out just how computers are running the things there. I would guessetimate over 60 of exhibits, machines etc. are computer controlled. It sure would make for interesting reading.

After we left Epcot we drove over to Melbourne, Florida to see some long-time friends Betty and Dick Tatton. We met the Tattons when we were stationed at Patrick AFB near Melbourne and where the Tattons and us, Teenie and I were involved with the Harbor City Volunteer Ambulance Squad. I was one of the original seven who starte the squad and was the first training officer. That is another whole story that could nearly fill the pages of **CTM**. Regardless it was nice seeing Betty, Dick and John Clarkson former Squad Commander and Training Officer. I had stopped off at the Tattons on my way from Miami hamfest up to the Manufactures Computer Expo in Orlando and planned this meeting. It sure was great. Too bad it couldn't have lasted longer. Dick may be writing some articles on his associated with computers before the home computer market began. Lets get to it Dick...

Charlotte Hamfest

This is another one of the good shows we look forward to each year. This was our third year to be there. Again the hamfest chairperson, Mary Weddle had help, I'm sure from her OM Clyde. I say again, the success or failure of a show isn't due to the efforts of one person. Hamfest are a collective effort and it pays off to all in a place to have fun, get a great buy and see old friends.

I don't think this years hamfest was as large as last years. They had about the same number of flea market tables, over 500 and the flea market was good.

Oh, I must make a comment before it slips my mind. I was told about the differences in the two ways of running the flea markets in Orlando and Charlotte. In Orlando the tables are all set up and have table covers on them. In Charlotte they are in a pile and as the flea marketeers come in, the grab their table(s) and go to their pre-assigned space. Then those who don't have a pre- assigned space got to the end of the tables and start setting up another line(s). The reason for this is readily understandable if you attend both hamfest. In Orlando the flea market is separated from the commercial area and can be entered without having to go through the flea market area. In Charlotte the flea market area is between the large overhead drive through doors. We commercial dealers couldn't get to the commercial area if the flea market tables are set up in advance. Just as a matter of interest I am told, Orlando tables are $15. each and in Charlotte $10.

I talked to many of the commercial dealers and they too, felt the show was somewhat smaller than last year. Some companies did well and others didn't. It depends on your products and price. At hamfest and computer expos there is a lot of price cutting and that is what the attendees are looking for. It always amazes me to talk to a computer company who has just attended their first hamfest and get their reaction to the "normal" request for a "best deal price". Most computer stores are not acquainted with the way hams go about buying at a hamfest. Oh well, they will learn!!!!

They and Orlando had a nice get together for commercial dealers after the show on Saturday night. This is one of the nicer ways dealers can become acquainted with other dealers away from the tables. Food was good and the crowd was good in both places.

This is another hamfest I will be looking forward in returning next year. They put on a good show... **CTM**

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Hidden Keyboard Commands on Your TS-2068

W. Fred Clabuesch

You've just handed over your hard earned cash for a new TS-2068 computer and hurry home to set up the system. After working your way through the excellent manual provided, you discover that at times when entering your listing some unexplained actions take place on your monitor as the listing is displayed. You also notice that as you DELETE through a listing line, Question Marks “?‘, appear and then are deleted. I'll attempt to shed some light on what those “?‘ indicate, how your listing maybe enhanced and some shorthand that can be included within the PRINT statements to reduce the memory used.

Imbedded Color Commands

We'll start with a clear screen and no listing in memory. First enter a line number and then get a E cursor displayed. Next hold down the CAP SHIFT key and press one of the color keys - say 4 - which will give you a Green colored K cursor. Now enter REMark and it will be printed in Green ink. That wasn't so difficult. The next step is to invert the paper and ink so press the #4 key while holding down the CAP SHIFT key. When the SPACE BAR is depressed, a Green square should appear. So far - So good. We have a Green background, now let's print in Yellow ink.

To get Yellow ink we must again bring up an E cursor - by holding down the CAP SHIFT & SYMBOL SHIFT - then without depressing any other key, press the #6 key. Behold, the L cursor is displayed and now it is Yellow on a Green background. Should you want to change the line to Green ink on a Yellow background, just hold down the CAP SHIFT and depress the #3 key - this switches the display back into the TRUE VIDEO mode.

Imbedded Flash/Bright Commands

Now let's have some fun with the listing and really make it an attention grabber! Hold down the CAP & SYMBOL SHIFT keys to bring up the E cursor again. This time while still depressing the CAP SHIFT key, depress the #9 key. The next character entered will be displayed in the FLASHing mode. This display feature can be turned off by duplicating the above operations, except depress the #8 key instead of the #9 key.

Following the same procedure as outlined above, obtain another E cursor. This time depress the #9 key without depressing the CAP SHIFT key and the paper/ink will turn BRIGHT. To turn off the brightness, obtain the E cursor and depress the #8 key without the CAP SHIFT key. This returns the paper/ink to normal.

We can now enter a listing in vivid color and have selected parts or word/symbols flash or turn bright as desired to attract attention to important program lines or REMark statements. These features also have some other extremely useful functions that can be used to SHORTEN program lines and separate sub-routines within the program listing. When entering program lines, I write all my REMark statements in Green and at the end of the statement change the ink back to the primary ink I'm using for the listing. This also resets the ink color from the default color Black set by the ROM when the computer is turned on. The advantage is that if you should desire to make the listing harder to read, set the paper color the same as the primary ink color and all that can be read are the REMark statements.

Now that we have learned to write our listing in color with portions flashing or bright, this technique can be used to advantage when writing PRINT statement; as the computer PRINTs literally and whatever is enclosed within the “ ” marks is printed as it appears in the listing. If you have entered the statement in a defined ink and paper color, it will be printed that way. If you used the imbedded FLASH and /or BRIGHT option, the characters or symbols will be printed as entered in the program listing. This reduces the amount of memory used as all of the ink, paper and flash commands for a print statement maybe imbedded and defined within a single command; i.e., -INK2; - seven memory bytes, becomes 1 byte when embedded. However, no matter what paper, ink or other attribute is specified before by the program listing, the embedded commands will be displayed when the line is PRINTed.

Some Useful Poke Commands

The following POK commands are useful when programming to assist in making the TS-2068 screen and operating system respondin a manner suitable to your immediate needs.

POKE 23658,8 — Sets the computer's cursor in the CAPS LOCK mode. **POKE 23658,0** — Returns the cursor to the normal mode. **POKE 23608,x** — Renders all program lines and screen printing unreadable. The default setting is 0. This address points to the start of the first character address in ROM and is incremented in steps of 8. Any number that is a multiple of 8; i.e., 16, 32, 48, 112, etc.; and less than 255 gives complete characters; however, they are above the character called for by a factor multiple. Numbers not a multiple of 8; — say 21 — gives completely scrambled characters as the character address starts in the middle of the actual character byte string. POKEing 0 in the immediate mode returns all normal characters.

POKE 23659,1 — Allows line 22 to be used for printing; however, a 2 must be POKEd before an INPUT request is used or your screen will go to vertical lines and all data stored in the display file will be lost.

POKE 23609,x — Sounds the 'sound chip' when a keyboard key is depressed. A number between 60 and 110 seems to give the best result.Just use a number that sounds pleasing to your ear.

Now that we have learned how to imbed colors, make things bright or flash — even all at the same time — lets put it TOGETHER so that the listing are divided into sections that stand out and also secure the program so that only you - the programmer - can get into it.

Here are some techniques that I have developed over a period of time and work well for my purposes. Use those that fit into your programming style. I make all my REMark statements green and white (1st color - paper/2nd color - ink) and flashing. This makes them stand out as the program is scrolling. My major subroutines are at the beginning of the program and each is in a different color paper and ink. Use what ever is pleasing to your eye and taste. The main body of the program is usually in the default colors (white/black). Then the initilization, instructions and ending routines follow to conclude the program.

Putting on a Program Lock

At the front of the program, write an ON ERR GO TO statement that will send the individual to a predetermined line in the program. I like to send them to the first menu routine when either the BREAK key or STOP is input in response to an input statement. The TS-2068 reads both keys as errors in response to INPUT, INKEY$ statements and also during computing routines. I also write a 'back door' in an INPUT or INKEY$ series so that I can break into the program at a later date if necessary. During experimenting sessions on the TS-2068, I found that the SYMBOL SHIFT key does not register when either an INPUT or INKEY$ request is made by the program, so my 'back door' is usually a CODE number for one of the math operators; i.e., +, -, /, *, etc... However, it could be any CODE number between 32 and 255. Whatever you fancy and will remember. This CODE number INPUT during a menu selection then sends me to a line that includes RESUME and the LIST command. The program will open up when your own CODE number is entered, automatically without touching another key on the keyboard. In a later article I will have more to say about how the computer reads the BREAK key and how you can determine when it has been depressed.

Summing Up

With practice you will have technicolor listing where each routine can be quickly located and hidden from view so that only you will know how it looks. But you editing job during development will be easier and quicker. Until next time, happy TS-2068 computing.

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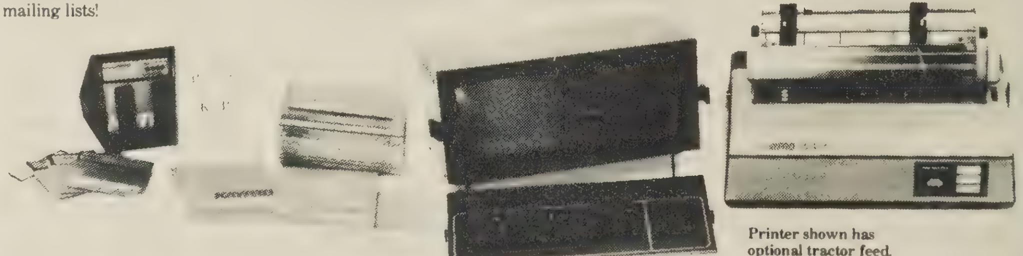

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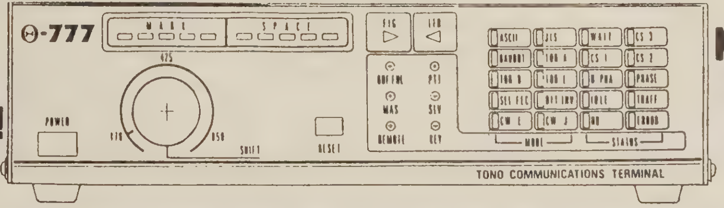

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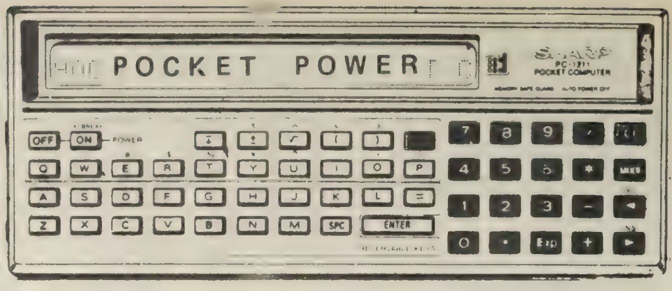

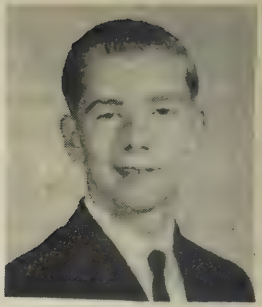

Joe Smith Jr.

This month I have listed programs 5 & 6 of the Business Package series.

Program 5 is called "Inventory Turnover". This program compares your cost of goods sold to your average inventory level. "Inventory Turnover" is used to assess your business's ability to convert merchandise inventory into sales.

Normally, the higher your turnover is, the better. This means you are moving the goods. However, as the turnover rate increases, so does the risk of stock shortage. By trial and error and by studying the turnover rates of similar businesses, you can determine what rate is desirable for your business.

Listing 1:

```
 9 VAC
10 INPUT "COST OF GOODS SOLD=$",S
20 INPUT "AVERAGE INVENTORY=$",I
30 C=S/I
40 N=C
50 R=INT(100*N+.5)/100
60 PRINT "INVENTORY TURNOVER= ";R;"
   "TIMES"
```

Listing 2"
Sample Run

```
RUN
COST OF GOODS SOLD=$?
50000
AVERAGE INVENTORY=$?
15650
INVENTORY TURNOVER  3.19 TIMES
```

Program 6 is called "Economic Order Quantity Program". In addition to keeping your inventory at the optimum level, it is the function of your control system to determine the Economic Order Quantity for each item. This is the number of units you must order so as to achieve the Lowest Total costs.

Using your reorder points and estimated demand levels as a spring-board, you already know what to order and how much. And you know the delivery capabilities of your suppliers. But should you place on large order? Several small orders? A few medium sized orders? What's the most Economical Order Quantity? This program will answer that question for you.

Listing 4:
Sample Run

```
RUN
SALES (IN UNITS) FOR THE PERIOD=?
100
COST OF ORDERING (CLERICAL,SHIPPING,
ETC.)=$?
75
INVENTORY CARRYING CHARGE (STORAGE,
INSURANCE,TAXES), EXPRESSED AS A
PERCENT OF INVENTORY VALUE. I.E. 15
% AS .15?
.10
PRICE PER UNIT=$?
1.25
ECONOMIC ORDER QUANITY= 346 UNITS
```

Listing 3:

```
10 VAC
15 INPUT "SALES (IN UNITS) FOR THE
   PERIOD=",S
20 INPUT "COST OF ORDERING (CLERICAL,
   SHIPPING, ETC.)=$",C
25 PRINT "INVENTORY CARRYING CHARGE
   ";
26 PRINT "(STORAGE,INSURANCE,TAXES)
   , ";
27 PRINT "EXPRESSED AS A PERCENT";
28 PRINT "OF INVENTORY VALUE. ";
29 INPUT "I.E. 15% AS .15",I
30 INPUT "PRICE PER UNIT=$",P
40 A=(2*S*C)/(I*P)
50 Z=SQR A
60 N=Z
65 IF N>INT N THEN 75
70 R=N: GOTO 100
75 D=N-INT N
80 IF D>.5 THEN 95
85 R=INT N
90 GOTO 100
95 R=INT N+1
100 PRINT "ECONOMIC ORDER QUANITY=
    ";R;" UNITS"
```

Well, that's it for now. Next month I will present the last program in my Business Series. Please write if you have any questions.

Joe C. Smith Jr.
P.O. Box B-36085
Florence, AZ 85232

CTM

Using the John Oliger Expansion System to Create Instant-Load (EPROM) Software for TS/1000 Computers

Part III.

Tony Gomez

I. Introduction

In part II last month, we showed you how to program two 2764 eproms, one with HOT-Z, the other with the Oliger machine code downloading routine.

```
DOWNLOAD MC UTILITY


C009█CDE702        CALL 02E7
C00C 2100C0        LD HL,C000
C00F 110B00        LD DE,000B
C012 19            ADD HL,DE
C013 5E            LD E,(HL)
C014 23            INC HL
C015 56            LD D,(HL)
C016 3A2140        LD A,(4021)
C019 A7            AND A
C01A EB            EX DE,HL
C01B 2019          JR NZ C036
C01D 010940        LD BC,VERSN
C020 C5            PUSH BC
C021 ED42          SBC HL,BC
C023 44            LD B,H
C024 4D            LD C,L
C025 EB            EX DE,HL
C026 110C00        LD DE,000C
C029 ED52          SBC HL,DE
C02B D1            POP DE
C02C EDB0          LDIR
C02E E1            POP HL
C02F 217606        LD HL,0676
C032 E5            PUSH HL
C033 C30702        JP 0207
C036 011540        LD BC,4015
C039 ED42          SBC HL,BC
C03B 19            ADD HL,DE
C03C FD3521        DEC (IY+21)
C03F 7E            LD A,(HL)
C040 FEFF          CP FF
C042 20CB          JR NZ C00F
C044 CF            RST 08H
END C045 0D         ERROR E
C046 00            NOP
C047 00            NOP
C048 00            NOP
C049 00            NOP
C04A 00            NOP
C04B 00            NOP
C04C 00            NOP
C04D 00            NOP
C04E 00            NOP
C04F 00            NOP
```

Now, we are ready to program our final eprom with "CETCH2". This is my program which demonstrates some of the features of the Oliger Video Upgrade. A general procedure will be discussed first, followed by the specific example: "CETCH2".

II. General Procedure

Before powering up, turn on the 48-64K area of RAM, and prepare the 2764 eprom programmer with a completely erased 2764 eprom.

The program that you wish to "burn" into the 2764 eprom must be already "SAVEd" to tape. If you don't need the variables, CLEAR the program before "SAVEing" to tape to save eprom space.

Now, if you have prepared your HOT-Z eprom, carefully place it in EPROM B location on Video Board B. If you have not, then you will have to reload HOT-Z on cassette form.

Assuming that "HOT-Z" is resident in the 8-16K space, and that your program is SAVEd on tape, call HOT-Z by whatever means is available to you. If you have the eprom version, you get it by calling RAND USR 8192. If you have the cassette, then load the HOT-Z cassette, and then go to the disassembly mode following successful loading.

HOT-Z is now in its READ or disassembly mode. Next, enter the next number C009. This is decimal address 49161. This is the start location for the temporary storage of your BASIC program. Note that when you have entered C009, you will see data "NOPs", indicating that there is no data there yet. Enter "Y" which gets you into HEX-EDIT MODE.

Next, enter "P", which sets the end-of-program (EOP) cursor. Enter the nex number FFFF (65535d), because this is the last possible byte of 64K ram available. Prepare your cassette player with the program to be loaded. Enter "J", which sets up the HOT-Z load routine. Do not enter the program name or double quotes. Hit ENTER and play the tape. HOT-Z will then proceed to load your program into the space between C009 and FFFFh (49161- 65535d).

If you are using the Oliger Video Upgrade, the border will alternate colors during loading. Eventually, the screen will indicate that loading has ceased. (no flashing borders). Hit "BREAK" key to return to HOT-Z. Note that now there is data in the 48-64K space. This is your newly loaded program.

Now, enter the nex number C014, and observe the disassembled data present at C014 and C015. Write down this nex data. Now, form a new hex number by taking the data contents of C015 and C014-1, where the latter is one hex value less than the data found at C014. This new number formed is the theoretical end of the program relative to the l6-32K RAM space, but since we did not load anything in there with HOT-Z, we must find the number relative to the 48-64K RAM space, where it truly is. Add 8000h to this new number. Enter this new hex number with HOT-Z. Using the "K" switch, find the decimal equivalent. Note: if the answer is greater than 57343, then you must do the programming in two steps. Oliger explains this in his notes.

All that remains is to quit HOT-Z, and enter a simple BASIC program which will actually program the 2864 eprom with the contents of high memory (what HOT-Z has just loaded in).

If all this has been just a bit too much to grasp, the following example will help clear things up. My basic program "CETCH2", which creates color patterns on the screen (using) Oliger's Video Upgrade), will be loaded into high memory for eventual burning onto an erased 2764 eprom. See listing 1 below. Enter the program in listing 1 by keyboard, CLEAR, then SAVE it to tape.

III. Example: Programming a 2764 eprom with "CETCH2"

Call HOT-Z by whatever means available.
Enter C009 in HOT-Z disassembly mode.
Enter "Y" to set the cursor at C009.
Enter "P" to set the end-of-program cursor.
Enter FFFF to set the end of program value (65535d).
Enter "J" to set up the HOT-Z tape loading routine.
Play "CETCH2" program tape. Don't enter title or double quotes. Just press "ENTER".
Observe that the program is being loaded in (flashing borders).
After loading is complete, (no border activity), hit "BREAK" which will return you to disassembly mode.
*Enter C014 and observe the following data:
C014 = B7h C015 = 4Ah Note that C014-l = B6h.
Form the new number C015 + (C014-l) = 4AB6h.
Add 8000h to this number to obtain CAB6h.
Enter CAB6h with HOT-Z and hit "K" for data display to obtain the decimal equivalent of 51894.

This address, 51894, is the address of the last byte of program as loaded by hot-Z. Escape HOT-Z by hitting "Q", and enter the following BASIC program:

```
10 SLOW
20 LET X = 8192
30 FOR N = 49161 to 51894 (the last address found above)
40 POKE X, PEEK N
50 PAUSE 4
60 LET X = X + 1
70 NEXT N
80 PRINT "PROGRAMMING COMPLETE"
90 PRINT X; " = NEXT AVAILABLE BYTE"
```

Before running the program, make sure that the VPP programmer is set to +21 volts. Hit ENTER, and the eprom programmer will perform its task. The programming time for "CETCH2" is about 4½ minutes.

From the program, one can see that every byte of data from 49161 to the end of the program at 51894 is being programmed into the 2764, beginning at 8192. The PAUSE 4 is vital because there is a minimum delay between programming consecutive addresses in the 2764. The 2764 is burned everytime the POKE command is given.

When finished, the display will indicate the message and the next available byte for programming. That means the next program you may wish to put on the current EPROM must begin immediately at this address. If you do have a new program that you wish to put immediately following "CETCH2", then in line 20 we must change the EPROM starting burn address as follows:

```
LET X = 10926
```

Since everything up to that address is already programmed with CETCH2. If the new program is longer than the theoretical bytes remaining on the current eprom, then the programming must be accomplished in two steps. John Oliger goes into this in his notes.

IV. Demonstration Program Use

At last you have finished programming all your 2764 eproms. Now it's time to use them. A few introductory words are necessary, however.

The MC Download eprom should be placed into EPROM B socket on Video Board B. Turn EPROM B switch ON. The EPROM with "CETCH2" must be placed into the EPROM A socket on the 2764 reader board, and its switch ON. The 48-64K RAM memory switch must be turned OFF. The 8-16K RAM memory switch must likewise be turned OFF. All these switches are necessary so that there will be no conflicts between RAM and APROM firmware.

Now you must identify the program on the 2764 read board to the computer. Do this by entering:

```
POKE 16417,0
```

---

*To verify accuracy of loaded program, perform a CHECKSUM as we did in part II last month, except change line 20: 20 FOR N = 49161 to 51894. The answer must be CHECKSUM = 106038.

What you are doing is identifying the first program on the eprom as "0". In general, POKE 16417,X where X is the number of the program desired to be downloaded. The first program number is 0, the second (if there is one) is 1, etc. Programs must be stored on eprom with no separating bytes.

If the desired program, other than program 0, does not exist in the cartridge, then the computer will return with report "E", program requested is not on cartridge board.

So, following your POKE statement, and after checking all switches for proper set-up,

RAND USR 8192

Which will call the machine code download utility resident in eprom B on video board B, and in an instant "CETCH2" will be downloaded into RAM from 4009h on.

Enter a number between + and -5. "1" is a good starting place. The "etch-a-sketch" pattern will begin. At any time you can change the paper and ink to one of 32 possible combinations by hitting "C". If you wish to see the number which created the particular paper/ink combination hit "S". The program will momentarily stop, and print the number at the bottom of the screen.

Keep in mind that many more paper/ink combinations are possible, but I programmed in those which I felt gave the best color contrast. See John Oliger's notes on how to create other combinations.

V. Conclusion

I hope this practical demonstration has interested you into a new, exciting way to enter programs on the Oliger expansion system. If you liked the use of HOT-Z and machine code in general, I'd like to recommend a new publication which goes into machine code programming on a very practical level: **"A PRACTICAL GUIDE TO MACHINE LANGUAGE PROGRAMMING ON THE TIMEX/SINCLAIR 1500/1000/ZX-81 COMPUTERS"** by David B. Wood, for $14.95 + $1.00 shipping/handling. It is available from SIRIUSWARE, 6 Turning Mill Road, Lexington, Mass. 02173. The book was recently reviewed (Oct'84) in SYNTAX. (Current ad is in CTM.)

I mentioned previously those of you interested in verifying if your 2764 eproms were completely erased could obtain a cassette program to do this. The program is entitled "PROMERASE", and comes with complete instructions. It even gives additional details on how to produce an eprom version for instant call up. It's available for $10.00 — postage, shipping, and handling included. Send your check or money order (preferred) to:

Tony Gomez
2013 Los Feliz Apt 3
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Next time we get together, I plan to talk about the new expansion system John Oliger has recently introduced for the 2068 computer. Until then, have fun and enjoyment with your expanded systems.

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A Pro looks at ProDOS

Number Six in a series

Curt Rostenbach

"CATs and CATALOGS, Part 2"

Last month I described the two forms of the catalog command. It was commented that my last article was a bit too technical. So, I have decided in the future I will double my work by trying to provide an introductory article and a technical article to ProDOS.

As stated before, ProDOS offers one major advantage over DOS 3.3 — you can read the directory from a program! This feature expands the potential abilities of almost any program tremendously. Reading directory can let you;

o find related data files.

o compute available storage from number of free blocks.

o verify proper disks are mounted.

o select programs to chain to.

o build files-on-disks database.

o sort directory for display.

The list can go on, but those are some of the major uses. Any one of them can be elaborated upon to enhance the operations of almost any program.

To read a ProDOS directory from a BASIC program, we have to open the directory and read it much the same as we open and read sequential data files. The difference is that we use the "T"-type parameter and while the file is sequential text, we have to pay attention to the structure in order to know when to stop reading the file.

At this point some of you may not be familiar with reading sequential disk files, so I'll do an overview before doing the catalog read variation.

To inform ProDOS that we want to do disk operations, or any ProDOS command, we have to have a way of getting ProDOS's attention. The method required is to print a CTRL-D, followed by the command we want ProDOS to execute. This is the same mechanism employed and pioneered under DOS 3.x. The programming convention has been to assign the string variable D$ with CTRL-D. The preferred method of doing this is with the statement D$=CHR$(4). This accomplishes several goals, it sets up the character that is needed to get ProDOS's attention, it assigns the character with is normally not visible in a visible manner, and will allow a visual cue so we will be able to quickly tell which print statements are intended for ProDOS within our program.

The three ProDOS (or DOS 3.x) commands that are needed to read a file on a disk are OPEN, READ, and CLOSE. To tell ProDOS what we want done, we will use the PRINT statement, and to get the results from ProDOS, the INPUT statement is employed.

To interact with a disk file we must OPEN the file first. As with many commands, it accomplishes several things at once. It confirms that the file exists, and in the event it doesn't, it creates the file. It also informs ProDOS of the manner in which we want to deal with the file, as sequential or random access. For the moment we are only concerned with sequential. A sequential file is one in which the data is read in a forward direction. This is like listening to a cassette tape with a player that has only PLAY and STOP buttons. We read (listen to) the file (tape) from the beginning towards the end. We cannot skip ahead or backup. The OPEN command is the equivalent to a REWIND to the beginning of the file (tape). The format for the OPEN command is "OPEN pathname [Ttype]-[,Sn]-[,D,n]-[,Rsize". The lowercase names represent information we have to supply, and the information and punctuation within the braces [] represent optional parameters. The [,Sn] and [,Dn] parameters let us select the slot and drive ProDOS is to look for a file. These are holdovers from DOS 3.x and I do not recommend the use of them, ProDOS allows us to sufficiently describe where the file is via the pathname. If we use only the pathname, we will be able to run these programs in systems they were not initially designed on. In other words we will be able to run the program on other machines that do not have the same equipment without having to rewrite the portions of our program that refer to files. We will be upwards and sideways compatible. Use of the pathname will keep us from writing ourselves into a corner. The [,Ttype] parameter allows us to open a file of any type, if we do not use this parameter, it assumes we want to open a text (TXT) file. The

[,Lsize] parameter is used to specify the record size (length) for random access files, when omitted it implies record size of zero (0) which is used to signify a sequential file. So, to OPEN a file on ProDOS volume /SAMPLE called JUNK, we use the statement PRINT D$; "OPEN /SAMPLE/JUNK".

Once we have a file OPENED, we can tell ProDOS when we want to READ it. The format for the READ command is "READ pathname [,Rnum]-[,Bnum]". The [,Rnum] is used to specify which record we want to read in a random access file and generally not used with sequential files. The [,Bnum lets us select what character within a record we want to start reading at, once again, not generally used in sequential files. So to start reading the file we OPENED above, we use the statement PRINT D$;"READ /SAMPLE/JUNK". This sets the stage for finally getting the data. After the READ statement, any INPUT statement will be supplied the data from the disk file instead of reading the keyboard as INPUT normally does. To get some data from our JUNK file we use a statement like INPUT A$. Now to tell ProDOS we are done reading from the file for the moment (we may want an input from the keyboard before reading more), we use the statement PRINT D$. The statement with the CTRL-D alone tells ProDOS to butt out and stop intercepting PRINT and INPUT statements. If we wish to read more from the JUNK file, we must execute a PRINT D$;"READ /SAMPLE/JUNK" again.

When we are done with the file, we need to CLOSE it. The format for the CLOSE command is "CLOSE [pathname]". Note that this time even the pathname is optional. If we supply the pathname, only that file is CLOSEd. If no pathname is supplied, ALL currently open files are CLOSEd. So to CLOSE our JUNK file, we use the statement PRINT D$;"CLOSE /SAMPLE/JUNK".

Now, to read a ProDOS catalog. Reading a ProDOS catalog is only slightly more difficult than reading a sequential text file, there just a few things more to keep in mind. One, the type of the file must be specified with a TDIR parameter in the OPEN command. Two, it has been my experience that ProDOS requires the complete pathname to be used, it does like partial pathnames to get you to either the volume directory or a subdirectory DIR filename. So for simplicity we will ask ProDOS for the current pathname via the PREFIX command. Three, there is a structure to a catalog file that we must be aware of to read the directory without reading past the end of the file and getting an error.

The structure of a catalog file is like this;

```
Line 1:   Pathname
Line 2:   Column titles
Line 3:   Blank
Line 4-n: File information in 80 column format
Line n+1: Blank
Line n+2: Disk space information
```

As you can see, we know what the first 3 lines of information contain, but from line 4 on, it is file information until we get a blank line, after the blank line comes the disk space information and that is the end of the catalog.

So to make a program that will read the current directory into a string array, the program would look like this:

```
10 REM PROGRAM TO READ PRODOS DIRECTORY
20 D$ = CHR$(4): REM ASSIGN CTRL-D
30 DIM FILE$(54): REM DIMENSION ARRAY FOR
NAMES
40 PRINT D$;"PREFIX": REM ASK PRODOS FOR
prefix
50 INPUT PREFIX$ 60 PRINT D$
70 REM USE CURRENT PREFIX TO OPEN DIREC-
TORY
80 PRINT D$;"OPEN ";PREFIX$;",TDIR"
90 PRINT D$;"READ ";PREFIX$
100 INPUT L1$: REM READ LINE 1
110 INPUT L2$: REM READ LINE 2
120 INPUT L3$: REM READ LINE 3
130 INPUT INFO$: REM READ FILE INFORMATION
140 IF INFO$ = ““ THEN 180: REM LOOK FOR
BLANK LINE
150 CNT = CNT + 1: REM WASN'T BLANK, ADD 1 TO
FILE COUNT
160 FILE$(CNT) = INFO$: REM ASSIGN INFORMA-
TION TO ARRAY
170 GOTO 130: REM GO BACK FOR NEXT FILE
180 REM ALL FILE INFORMATION READ
190 INPUT DISK$: REM READ DISK SPACE INFOR-
MATION
200 REM ALL INFORMATION IN, CLOSE DIREC-
TORY
210 PRINT D$;"CLOSE ";PREFIX$
220 STOP
```

By line 220, we have read the directory information for the current PREFIX. If CNT = 0 then there were no files in the directory, otherwise the information on the files is stored in the string array FILE$(1) thru FILE$(CNT). The string DISK$ contains the disk space information.

Where do we go from here, by replacing line 220 with the beginning of a program to use the information we have captured, is up to you. I will use this program fragment as the jumping off point between the "Pro looks at ProDOS" series and the new "TECH: ProDOS" series. Next month, we will follow the ProDOS bootup sequence.

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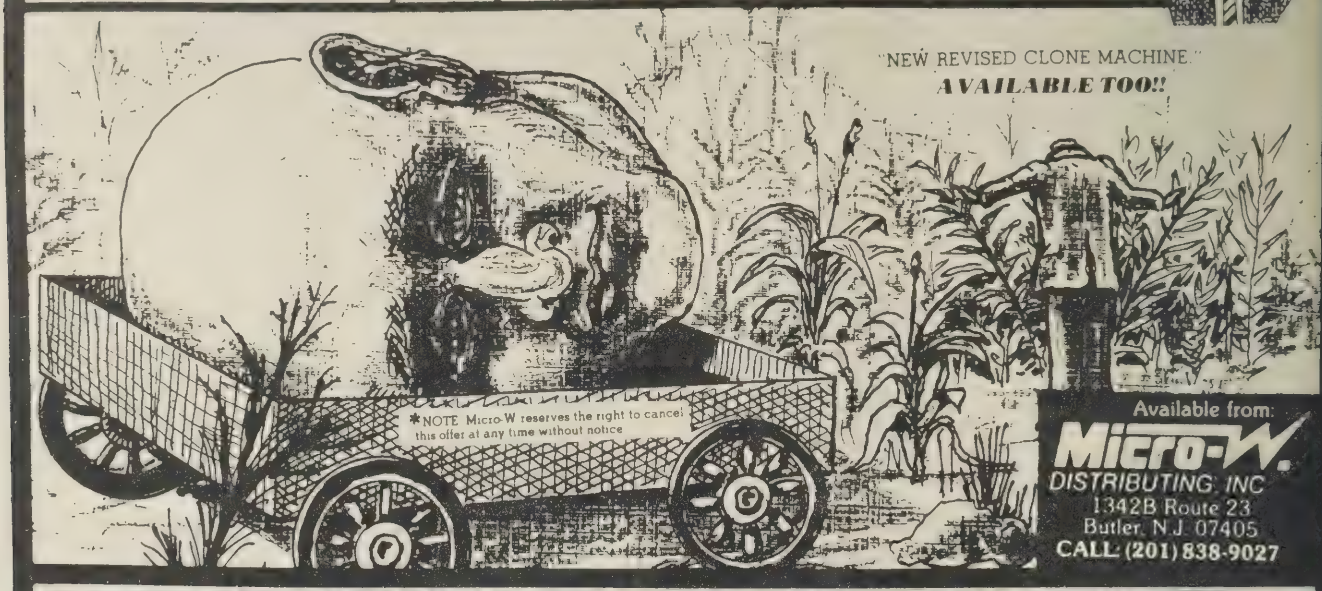

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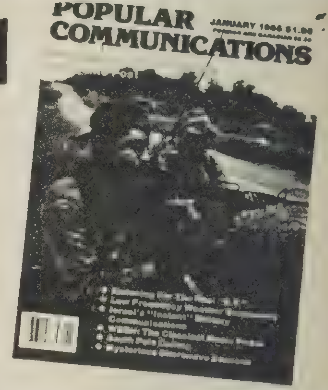

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The Expandable ZX-80 and ZX-81

Hardware Projects For The Sinclair ZX Mini Computer For The Hobbiest By A Hobbiest

John F. Jarrett

In the modern computer are a number of small electronic packages By which contain hundreds and even thousands of semiconductor devices all designed to either turn something on or something off. These are called Integrated Circuits. Some, however , are designed to amplify sound or voltages, and these are known as linear devices.

We will be mostly isolated to the integrated circuits which are digital, which again turn things on of off. More directly with the type of IC known as TTL. TTL circuits are transistor- transistor logic circuits. These come in various types such as regular TTL, Schottky TTL and Low Power Schottky TTL. All are identical in function, but each has a different speed of operation and all use a five volt power supply. The main consideration of the types of TTL is power or current consumption, the amount of drive needed to enable a gate and the amount of current that a TTL output can sink or source.

In the ZX-80 and ZX-81 Low Power Schottky TTL integrated circuits are the most common, since the unit is designed to operate on a low current power supply. These low power ICs are what we will be using on the projects ahead in order to simply conserve power, so that a massive power supply is not needed.

The speed of Low Power Schottky TTL is faster than the others, and since the ZX-80 and ZX-81 operate at a speed of 3.25 megahertz, (three million two hundred and fifty thousand cycles per second), Low Power Schottky devices are also a good choice.

At a speed of operation such as the ZX-80/81, some strange things can happen inside the machine when 'things' are turning on and off at such a terrific rate. These are commonly referred to as "glitches", and without something to absorb these glitches, a computer would never fully give us a usable tool. Therefore, capacitors must be placed between the positive and negative power supply lines in order to absorb these glitches.

A capacitor simply blocks D.C. or direct current, while permitting the passing of an A.C. or alternating current. The size in microfarads of a capacitor is related to the frequency of an A.C. current that the capacitor can pass through it.

Resistors on the other hand reduce current and have no connection with frequency.

We have now seen the three major types of electronic components that make up a ZX-80/81; integrated circuits, capacitors and a few resistors. But how are all of these things linked together to make a computer? Let's look a little deeper.

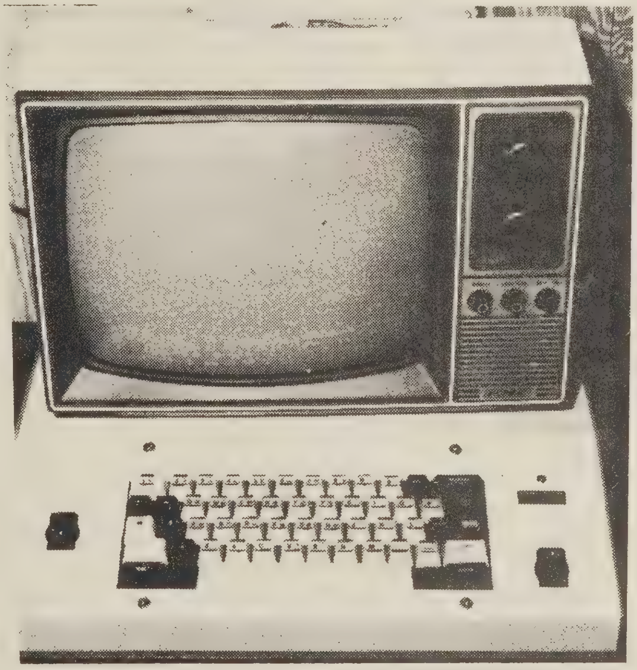

Figure 1-1 — The above picture shows the expandability of your ZX by simply adding a case and full size keyboard, the usefulness of the ZX is greatly expanded!

In all computers there is a ROM, known as a Read Only Memory. Contained in this integrated circuit is an electrical coding which tells the CPU or Central Processing Unit, (the big brain), exactly what to do at a specific time.

When the computer is first turned on, there is a circuit which starts the CPU counting, in essence, from 0. This counting sequence is given to the ROM and the ROM outputs specific instructions back to the CPU and also to the RAM, or Random Access Memory, where these instructions are stored and can be called

	LSB MSB	LSB MSB
COUNT	ADDRESS LINES (16)	DATA LINES (8)
0	0000000000000000	00000000
1	1000000000000000	10000000
2	0100000000000000	01000000
3	1100000000000000	11000000
4	0010000000000000	00100000
5	1010000000000000	10100000
6	0110000000000000	01100000
7	1110000000000000	11100000
8	0001000000000000	00010000

Figure 1-2 The examples above show through the number or count of eight. The series continues on to the maximum count.

upon at another time. At a specific count, the ROM ceases outputting any instructions to the CPU and RAM, and now awaits for something to be entered into the machine.

As we earlier mentioned, when the computer is turned on, everything starts from a count of 0. All sixteen address lines are low. As the count increases, the address lines have changed states and have enabled the ROM to pass data to the CPU.

With sixteen address lines, the maximum count is 65,536, which could be decoded for memory use to 65,536 pieces or bytes of information. However, the ZX machines use the two upper address lines, A14 and A15 for memory and video operations. Therefore, the maximum amount of usable memory storage for programs is 16,384 bytes. This can be expanded to 48,000 plus bytes for storage of program variables. We will limit ourselves to 16,000 bytes of memory.

Data lines are similiar to address lines except that there are only eight data lines, and the maximum count that can be established is 256. A single data line is known as a bit. Four data lines is known as a nibble, and the complete of eight data lines is known as a byte.

As you read address lines or data lines in their binary equivalent as shown above, the least ordered digit is the first digit, and is known as address line 0 or data line 0. A0 or D0, A1 or D1 etc.

As an example, five equals the following:

	A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15
	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
LSB	D0	D1	D2	D3	D4	D5	D6	D7								MSB

We now have a little better understanding of what address lines and data lines are, but how can we use them to build hardware that will work properly?

What we need now is a decoder that will take the binary number and turn it into its decimal equivalent. We have several integrated circuits that will do this chore. These are the 74154 and 74138.

These chips will take a BCD input, a nibble, and will convert the binary code into an output of 1 to 8 outputs, for the 138 and 1 of 16 for the 154. With a binary number of 3 on the input of either of these integrated circuits, the fourth output will go to a low state. The others will remain in a high state.

These IC's have other inputs known as Chip Enables. When these pins are either high or low, depending on the IC the IC is enabled, or allowed to operate.

In the projects ahead, we will produce expanded memory and other useful functions.

But first, let's add some amplification or buffering of the address lines and data lines in the ZX-80/81. Since most signals are weak due to the fact that any single data or address line is connected to a number of other integrated circuits. This is known as reaching the IC 's fanout. A fanout is simply the number of other IC's that a single IC can drive.

For example, an LS TTL IC can drive up to ten (10) inputs or five (5) regular TTL inputs. Therefore, the LS chip has a fanout of five (5) for regular TTI or a fanout of ten (10) for LS TTL IC's.

Chapter 2, Buffering next month...

John F. Jarrett
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is

CTM

The Truth About Surge Suppressors

James Zorman

Over the past several years I've watched the power line surge suppressor part of the microcomputer market explode. Two years ago there was really one company in the business. Today there must be over fifty. As the competition grew more intense statements concerning performance went from mild to wild, so that today many surge protector sellers will say almost anything to get a sale (knowing that the ability to disprove their statements is technically beyond most buyers).

Slowly the buyer (both reseller and end-user) has become more educated as to the technical facts regarding surge protection. This article is an attempt to accelerate that process.

Within any surge protection device are protective components which are wired across the A.C. line. There are several different technologies of protective components used in these devices. Under normal conditions these components remain inactive. They passively monitor the line voltage ready to respond to any overvoltage condition which may occur. When an overvoltage transient (a momentary "spike" or "glitch") does occur the protective component "fires" and absorbs the destructive energy within the transient, thereby converting it into harmless heat before it is allowed to pass through to sensitive electronic equipment.

All surge protectors can be classified based on the technology of protection they contain. The following is a brief discussion of the major technologies prevalent in the marketplace.

The M.O.V.

The vast majority (probably 80) of A.C. line surge protectors available in the microcomputer market are based on the metal oxide varistor (MOV). These inexpensive nickel-sized devices provide a high energy but relatively short-lived degree of protection. Many MOV based units bear both exorbinant prices and/or misleading specifications.

The MOV is essentially a voltage sensitive resistor. It is capable of handling high energy transients. Its response time is excellent but its major failure is that its firing voltage can vary over its operational life.

The Zener Diode

Unlike the MOV, the diode provides a protective response which is consistent over time. It always fires at precisely the same voltage. Devices based on diode technology often provide protection over several decades.

The major shortcoming of the diode is that it cannot tolerate high energy transients and is prone to failure when it is called upon to handle transients which exceed the device's rather limited capacity.

Because of this vulnerability, the zener diode is capable of absorbing high energy transients.

The Gas Discharge Tube

The gas discharge tube is capable of handling very high energy transients.

The gas discharge tube has two shortcomings. First, the response time is extremely slow. Second, the firing voltage is somewhat higher (resulting in a somewhat lesser degree of protection) than the other popular technologies.

What to look for in the Specs

NOTE: It takes approximately $20,000 worth of equipment and the services of a competent engineer to disprove a manufacturer's specs. Therefore, it has been common for manufacturers to provide specs which run from straight facts to pure fantasy.

Response Time

This spec gives you an indication of how long it takes for the protective components to react to a fast rising overvoltage transient.

This spec is widely abused in the industry. Several manufacturers claim response times of one picosecond (one millionth of one millionth of a second). Such a response is wildly unrealistic. Manufacturers that claim response time in the 1-5 nanosecond (one to five billionths of a second) range are much more realistic.

In actual bench tests (conducted by yours truly), 5 nanosecond (2KV) pulses were adequately clipped by both MOVs and diodes.

Energy Dissipation

This is a measure of how much transient energy a protective component can absorb before failure. This spec can be stated in several ways. To quote this spec in terms of watts can be very misleading. Any watt spec must include a time span that indicates how long this level of wattage can be absorbed. By halving the time spec we can double the stated wattage. Some manufacturers even state a wattage figure with no indication of time period. Such a spec is entirely worthless.

A much better indication of dissapation is the Joule. The Joule is a unit of energy over a fixed time period. It is much more difficult to play with a spec stated in Joules. However, manufacturers exaggerate Joule ratings. One manufacturer even claims 100,000 Joules!

A minimum Joule rating of 40 is generally sufficient to protect sensitive equipment in a typical residential/office environment in most areas of the U.S. In the southeastern U.S. a higher Joule rating may be required due to the much greater incidence of lightning in those areas.

Max Voltage

Claims as to maximum voltage ("Our unit can withstand voltages up to 15,000 volts!") have very little meaning. A 15,000 volt surge will "flash over" (jump across the wires) long before it gets to your wall socket. Most transients fall in the 200-2,000 volt range, hence a max or peak voltage spec has very little meaning.

Modes

Most residential power today is provided over three wires. Most overvoltage transients occur "across the line" (across the two flat prongs on a plug). In specs this often is called the "differential mode". Additional protection can be added from the hot side of the line to ground ("common mode"). Even though few transients occur between the remaining mode (neutral to ground), some manufacturers prefer to add protection here also (full three mode protection).

Lighting

A lightning bolt contains a great deal of energy. While some surge suppressors will protect you from lightning **induced** (caused by a lightning strike a half mile or more from your location) you can expect a direct lightning strike (within several hundred yards) to destroy anything that is plugged in (even if it is turned off). Claims that a particular protective device will protect you from a direct lightning strike should be ignored.

NOTE: When lightning is in your immediate area, it is always wisest to unplug valuable electronic equipment.

Summary

1. Always use a unit that provides at least dual mode protection (three mode protection is best).

2. Make sure the Joule rating is sufficient. Thirty to forty Joules for the northern and western states. One hundred Joules for the southeastern states.

3. Use a unit that includes EMI/RFI filtering. Filtering can protect your data from radio signal damage.

4. Insist on a status light that tells you at a glance if your protection is still in effect. Just because a unit has a lamp doesn't mean it indicates that protection is working properly.

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The Trash Can

An Interesting Review

Steve Gilbert, P.E.
WD4EKN

Many computerists are looking for bargains in printers these days. One such bargain available right now is the Gorilla Banana.

The Gorilla Banana is a 5X7 dot matrix printer that is now being marketed mail order as a factory overrun by DAK INDUSTRIES 1 800 325-0800, 82 Remmet Avenue., Canoga Park, CA 91304. DAK is a well — known slash price sell it quick electronics mail order house. They have some good bargains from time to time in consumer electronic goods. They are presently selling the Banana for $129.00. I have not seen a price competitive with this for what you get. A Gemini 10X can be had for $225.00 with a lot more features but then $129.00 may be all you have to invest in a printer. If you need bare bones then spend a dollar wisely.

DAK sells the Gorilla Banana in the choice of serial RS 232 interface or Centronics-type parallel. It is, in my opinion, a good buy for the money if you take a couple of thing into account.

First, you need to read the technical items below. If you can't understand them, the Gorilla is not for you. If you can, then you need to look at your requirements for a printer.

The Gorilla has the complete ASCII character set, both upper and lower case. It does not, however, print descender lowercase (it can't..its 5X7 dot matrix). Nonetheless, the print quality is very acceptable, even for light word processing work. It is slow, but not a turtle. It is much faster than a selectric I/O.

No doubt some have bought the printer only to get frustrated when it would not work with their computer. Read the notes below before giving up on the Gorilla as a useable piece of equipment.

Gorilla and the Trashes

A good friend of mine bought a serial edition of the Gorilla to use with his CoCo. When he got it, it simply would not work. The manual that came with it talked about how to set up the dip switches, but the dip switch layout did not match the actual physical equipment in his printer. Calls to DAK were futile, as DAK has primarily high volume sales people who have limited technical assistance available. The friend called THE LEADING EDGE and inquired about his situation. They were most helpful. They sent him a new manual (the Leading Edge had put the wrong manual in the box at the factory), and told him how to set up the dip switches in his printer while it was on the way. It is now printing without any problem. The baud rate was pre-programmed to something other than the CoCo,s default 600 baud, but this was a problem easily overcome with the POKES mentioned in a previous TRASH CAN article.

The parallel interface presented the most hair-raising problem. Another friend ordered the parallel version of the Gorilla for use with a Model IC TRS80 system. Note that the Model I, III, and IV all use practically the same interface electronics and cable, so the following is good for anyone out there experiencing problems with the Gorilla working with any of these interface (Kaypro, IBM, etc).

When the Gorilla is connected bare-bones to a computer such as mentioned above, it will immediately go into self test mode. The computer will have no control over the printer.....it just keeps on going into self-test. The reason is simple...much simpler than you think. The Gorilla follows standard Centronics type interface design with regard to its connector pinouts WITH ON EXCEPTION. Usually, all of one side of the 36 pin connector is ground, with most signal lines on the opposite side. The Gorilla has a self- test-not line at the printer, so the printer logic solution...very simple. Carefully break pin 35 out of the connector on the printer end and at the computer end of the printer cable. This allows the printer self-test-not line to pull high and clear off the self test mode, and communications from the computer to the printer will magically become possible. It is imperative that the dip switch settings then be set up as desired for the mode of operation you want. Generally, for TRS80 use, the automatic line feed on receipt of carriage return should be activated, but this depends on what software you are into heaviest.

Summary

The Gorilla is a good buy for the money if you only have $129.00 (that's less the cable, but then everybody else's price is less cable, too). Order the right type of printer for the right application (serial or parallel), and verify you have the right manual with your printer. Then hook it up, but if it doesn't work don't give up and ship it back or get frustrated, as the problems are probably minor. Correct as per above, or use the pinouts provided and solve your problem. The Leading Edge seems willing to help with regard to technical support on minor problems. Call or them rather than DAK.

Perhaps someone with a Gorilla on the shelf will get it back down and make it work. If you already know all this, then maybe you have something to throw in the TRASH CAN!!

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Roger E. Jones

Responses and Comments

This past month one software publisher submitted a program for review and I received a response from Charles Palmer-McCarty of TOTL Software, Inc. regarding January's review of TOT.INFOMASTER. In addition, one reader asked a question about accessing the double strike capability of his printer. The latter point brings to mind one of the weakness of the Commodore 64: the difficulty of accessing periperals. The IBM-PC is, for example, much less complicated in this respect. Since this problem is shared by all C-64 users I will review several useful procedures for communicating with printers and then respond to Charles' comments. This month's software reviews will include LOADSTAR'S monthly disk #3.

One way to set your printer configurations without having to enter your program and make changes is to refer to your printer or interface manual for the CHR$ codes. Reasonably sophisticated word processors allow you to specify most printer options so one does not have to resort to modifying the program (this process is extremely difficult for protected programs or those in machine language). If you happen to have the latter type of word processor and want to take advantage of printer functions that are not provided for in your word processor, the CHR$ codes will allow you, in many cases, to utilize the capabilities of your printer in a relatively simple manner. The following observations work with my Gemini 15X printer. If you have a different printer, check your printer manual for the proper CHR$ codes.

If, for example, you want to use the double strike function of your printer, enter the following commands in the direct mode before you load your word processor: OPEN4,4 (note: hit return) then PRINT#4,CHR$(27)CHR$(71) (note: hit return). The READY prompt should be on the screen after each return. This procedure is useful for those types of printer functions that are used throughout the entire text. Examples of these are: the double strike, condensed and emphasized print modes.

The following listing is a simple screen dump program that can be added to your programs that lack a printing feature. This program by, E. J. Lippert II, was taken from Cardco's +G printer interface manual (the manual is not copyrighted).

```
10 PRINT"<CH>"
20 GET A$: IF A$="" THEN 20
30 IF A$ = CHR$(133) THEN GOSUB 63999
40 PRINT A$;:GOTO 20
63000 REM *** SCREEN DUMP
63030 OPEN4,4:CG = PEEK(53272)
63040 IFCG=23THENCLOSE4:OPEN4:OPEN4,4,7
63050 SC = 1024
63060 FOR IO =0 TO 999
63070 CO = PEEK(SC+IO):IFCO>128THENCO=CO
-128:CR=1
63080 GOSUB63300
63090 IFCR=1THENPRINT#4,CHR$(18)CHR$(AO)
CHR$(146):CR=0:GOTO63200
63100 PRINT#4,CHR$(AO);:LO = LO+ 1
63200 IF LO=40 THEN PRINT#4," ":LO=0
63210 NEXT IO:CLOSE4:RETURN
63300 IF CO<32 THEN AO=CO+64:RETURN
63310 IF CO<64 THEN AO=CO:RETURN
63320 IF CO<96 THEN AO=CO+32:RETURN
63330 IF CO<128 THEN AO=CO+64:RETURN
63340 AO=32:RETURN
63999 GOTO63000
```

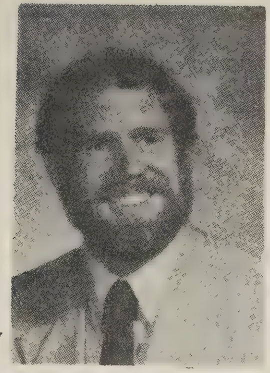
You may run the program as listed and place whatever you wish on the screen then press the F1 (function key). The contents of the screen will be dumped to your printer. You may also use this routine to add a printing feature to your programs by adding a GOSUB 63999 at the point(s) in your program that you wish to dump the contents of the screen to the printer. This program will not dump hi-res screens nor will it perform functions your printer does not have.

The December 1984 issue of RUN magazine has a machine language screen dump that can be used within many programs. This is desirable if, for example, one would like a printout of the instructions which are included with many programs. Robin Franzel wrote this program and was most helpful in locating a listing error I made while typing in the program.

Charles Palmer-McCarty of TOTL Software, Inc. wrote and indicated that he was pleased with the review of TOTL.INFOMASTER in last month's issue of **CTM**. He did, however, note that I made an error in this review. In this review I stated that report generating capabilities." Per Charles' suggestion, I have reviewed the report generating capabilities of TOT.INFOMASTER in greater detail and have found

CONT JONES Pg. 32

Computer Learning



Robert E. Morgan, K8RBV

It's a lot of fun to make predictions especially if trends in technology or the use of technology back up those predictions. So, after attending a number of conferences and discussing the possibilities with colleagues, here are a few soon-to-happen predictions on the use of computers in education. By education, I mean not only formal schooling from kindergarten through doctoral work, but self-education as well.

1. Several columns ago I discussed the emerging use of the interactive computer-controlled video disk in education. Even in the few months since that column, enormous strides have been made. More and more, schools will be using these devices as the price drops quickly.

2. The lap computer may provide the biggest revolution in education in the near future. More and more, students, even at the lowest levels of instruction will be using lap computers to take notes, solve problems, write papers, etc. Just as a number of colleges now require students to purchase a personal computer, the lap computer may soon become a requirement. In the near future, some private high schools may require lap computers. Several high school students I work with use them now on a regular basis for notetaking and word processing.

3. The quickly emerging field of robotics will soon have an impact on education. Already it's time to consider "robotics literacy." today's students will find robots an important force in whatever job or profession they choose. Robots will probably be more computer controlled tools than R2D2 type androids.

4. Computer graphics will become more and more sophisticated. Just as pie charts, line graphs, bar graphs and 3-D graphs will play a bigger and bigger role in business, they'll play a bigger role in education. Student reports will contain more computer generated graphs (making their reports that much neater) and the overall conceptual ability of students will probably be positively improved.

5. Mechanical, spatial storage and retrieval systems will greatly diminish in importance. Libraries, even school libraries, will come to rely more and more on electronic archival and retrieval systems from computer disk to *micro- microfice to video disk. Ultimately, all of those archival materials may be used interactively, although the smart money in the video disk as the lasting archival system. Students who need information won't need the library--just a modem. The book will not be dead, however. In fact, increasing technological development will increase the need for and interest in books and magazines. Fiction for leisure reading will escalate in importance as a break from digital systems, partly as a result of the increased interest in interactive fiction on the computer. This book boom will simply be a continuation of a trend which is operating now — the book business is booming — even in an age when computers are of interest to almost everyone.

6. Online databases will greatly increase in importance and find many uses in education, particularly in research, but also in interest areas. There will be data base information services for almost every hobby, specialty, profession, and need. Used in connection with portable, wireless, cellular phones, the computer-accessed database will be available everywhere.

7. The use of satellites as information relays will continue to develop and satellite access from lap computers may become a reality. Education programs will be simultaneously available to students and other interested parties across the entire country. Software programs can also be shared and downloaded via satellite.

8. Just as some jobs may soon be done from the home via remote terminal, student work may soon be done via computer and modem. Envision a situation where students who are home from college can access information in the college library using a terminal and a modem. Lecture and laboratory may not be replaced, but some research functions may not require physical presence on the college campus.

Thanks to those who have written. I'm way behind in correspondence, but I will try to answer every letter.

Next month: a portrait of several young computer "hackers" (using hacker in the best sense of that much maligned word).

Comments, Correspondence to:
Robert E. Morgan
director, computer center
University School
20701 Brantley Rd.
Shaker Heights, OH 44122
Source mail: BCC950

CTM

FROM JONES Pg. 30

that his criticism has some validity. The fact that only five fields can be sorted led me to inadvertently assume that only five columns could be printed across the page. In reality, up to 200 columns can be printed. In effect, the number of columns is dependent on the printer capabilities, the size of the paper and the length of the fields. I regret this mixing of terms and appreciate the opportunity to correct this mistake for **CTM** readers. I do, however, feel that my general conclusion that this program has limited report generating capabilities is a reasonable statement for the reason that just five fields can be sorted at one time. Even the FILING ASSISTANT, one of the first data management programs for the C- 64, allowed one to sort by as many fields as one would like. To be sure, this type of data presentation may be peculiar to me and not so important to others. Overall, I feel that the review was a fair and balanced assessment.

Software Reviews & Recommendations

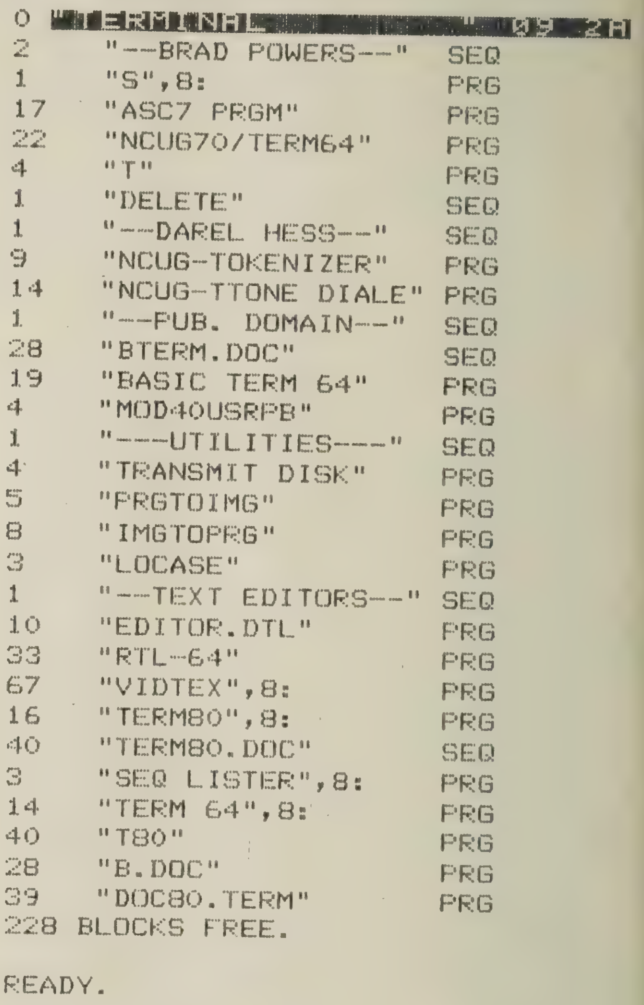
LOADSTAR, the publishers of a monthly disk, submitted issue #3 too **CTM** for review. This publication is similar to THE GOLDEN DISK or COMPUTE'S GAZETTE DISK which are also produced on a monthly basis.

TITLE: LOADSTAR
TYPE: Monthly Disk, #3
AUTHOR: N/A
FORMAT: Disk
COMMENTS: Double Sided Disk
Price: $9.95
PUBLISHER: LOADSTAR, P.O. BOX 30007,
4023 Greenwood Rd.
Shreveport, LA 71130

All programs on this disk are unprotected and most can be list. The latter point is valuable for those who may which to examine certain programming techniques or modify these programs to suit their on purposes. Over 50 programs are list on both sides of the disk.

As one might expect, some of these programs are much more meaningful than others. Many of the programs are merely what I would describe as "chatter" between computer aficiandos. The disk does, however, have several worthwhile programs that make the purchase a reasonable investment. The 4 Minute Copy program and the Smurk game are such examples. I did not examine all of the programs on this disk. The following list gives a brief description of those programs that I did examine. All of these programs are very basic in nature, but all did load and run satisfactorily. After this summary I have Included a listing of the programs on each side of the disk. In effect, what you see is what your are buying. I would note that little has been gained by placing programs on both sides of the disk since most of them could have been placed on one side. Most C-64 users are aware that it is not a good practice to utilize both sides of a disk in the 1541 disk drive.

Stress Test — Dr. Holes compute your social adjustment factors.
Poker Parlor — This is a five card draw program.
Smurk — This is a Zork type game.
4-Minute Copy — This copy utility will copy basic programs in approximately four minutes.
Checkbook Balancer — This program will reconcile your bank statements.



```
0 "TERMINAL            " 09 2A
2    "--BRAD POWERS--"   SEQ
1    "S",8:              PRG
17   "ASC7 PRGM"         PRG
22   "NCUG70/TERM64"     PRG
4    "T"                 PRG
1    "DELETE"            SEQ
1    "--DAREL HESS--"    SEQ
9    "NCUG-TOKENIZER"    PRG
14   "NCUG-TTONE DIALE"  PRG
1    "--PUB. DOMAIN--"   SEQ
28   "BTERM.DOC"         SEQ
19   "BASIC TERM 64"     PRG
4    "MOD40USRPB"        PRG
1    "---UTILITIES---"   SEQ
4    "TRANSMIT DISK"     PRG
5    "PRGTOIMG"          PRG
8    "IMGTOPRG"          PRG
3    "LOCASE"            PRG
1    "--TEXT EDITORS--"  SEQ
10   "EDITOR.DTL"        PRG
33   "RTL-64"            PRG
67   "VIDTEX",8:         PRG
16   "TERM80",8:         PRG
40   "TERM80.DOC"        SEQ
3    "SEQ LISTER",8:     PRG
14   "TERM 64",8:        PRG
40   "T80"               PRG
28   "B.DOC"             PRG
39   "DOC80.TERM"        PRG
228 BLOCKS FREE.

READY.
```

Software Review Policies *PAR-64 for CTM

If you have developed a practical software application for the Commodore 64, forward a copy of the program and a review will be included in this column. While every effort will be made to review all programs that are submitted, the extent of the review will depend on my judgement as to its overall value and time/space factors. I will notify you when your review appeared in **CTM**. Commercial software submitted for review will not be transmitted to any third party. Send to: Roger E. Jones PAR- 64, 3604 Chaumont Dr., Birmingham, AL 35233. **CTM**

Oscar Sensabaugh

T/S 2068 SOFTWARE REVIEW

"SPECTAX85"

Copyright 1985 by Poretsky & Poretsky,
Inc., 521 Argyle Road, Brooklyn, N.Y.
11218 ($16.95)

Just a short time back when I was turnin my mind to thoughts of (UGH!) 1040s and the associated alphabetical list of "Schedules," I got aholt of a program designed to help a guy do his/her annual "voluntary" (HA!) submission of revenue to the revenoors. It was submitted to me for review and comment, although it admittedly contained (UGH! again) "bugs".

I replied to the effect that I did not normally review "Pre-Production" software for publication, but the program appeared to have possibilities if only, etc., etc.

My "if only, etc., etc." got took serious like, and today I got to make a preliminary run through the IRS jungle with Poretsky & Poretsky, Inc.'s SPECTAX85, Production model.

So far, I come out smellin like a rose, I got a small refund comin!

SPECTAX85 covers Form 1040 plus Schedules A, B, C, D, E, G, R, W, SE, and Form 2441, whatever the heck that is. Whatcha gotta do if married is to input "file separate" data, then SPECTAX85 does a his-hers-theirs thing so you can pick out the best options. It also alerts you to possible "income averaging" advantages in case '84 was a bummer for you or something.

Only the main 1040 and Schedules A and B are savedfor later review, so screen print-outs of the other schedules, etc., should be made when the option is offered by screen prompts..

A real cute feature of the program is a "Heavy Print" option which, if selected, looks great on the screen and better yet on the 2040 printer. The program uses the "COPY" function with the 2040 printer. It also contains a feature allowing use of a larger printer (including the "Heavy Print" option) via the AERCO interface. I do not have the AERCO I/F, so could not test this feature.

I been told that gettin all the aforementioned stuff into the program was a mite touchy. The program contains all the necessary instructions for its use displayed on-screen, so further, documentation is not really required. It takes awhile to load, and RAMTOP must be no lower than 63487 at load time. Despite all this, keybord response is excellent and waiting time during calculation periods is very reasonable.

Getting down to the nitty-gritty, my test of this program consisted of inputting my own personal data (slipping in an estimate or two where firm data has not yet been received). I could not find any errors in the resulting calculations, and all the schedules I required were on tap. Only time I got shook up was when it showed me owin a bundle. Then another look at the screen told me I was readin the "file separate" figgers, and when I got to the "joint" figgers my pulse went back to normal again. Also decided to stay hitched fer awhile.

For self-protection, Poretsky & Poretsky, Inc. assumes no responsibility for the accuracy of your (or my) final return and offers no warranty of usefullness or accuracy of the program, but will replace defective tapes.

I aint assumin none of them responsibilities neither, except for my own return! I double-check mine every year, and hope to heck you do too! Iffen you are single and your taxes is too high, go a courtin, it might make a BIG difference next year.

Oscar Sensabaugh
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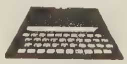

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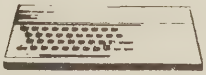

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4.433618	.75
4444.000	1.25
4.9152	2.49
4.916 Bd. Rate	1.25
5.000000	1.50
5.0688	2.50
5.616	1.59
6.000	2.49
6.176	1.49
7.164112	1.00
7.3728	1.49
8.000	1.49
9.000	1.49
9.90000	1.25
10.69425	2.50
10.8864	1.49
10.920	1.49
11.088	1.59
12.000	2.75
13.440	1.00
14.31818	1.00
15.2	1.10
16.00000	1.50
16.5888	1.49
17.430	2.49
18.000	1.49
18.2259	1.00
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20.000	1.50
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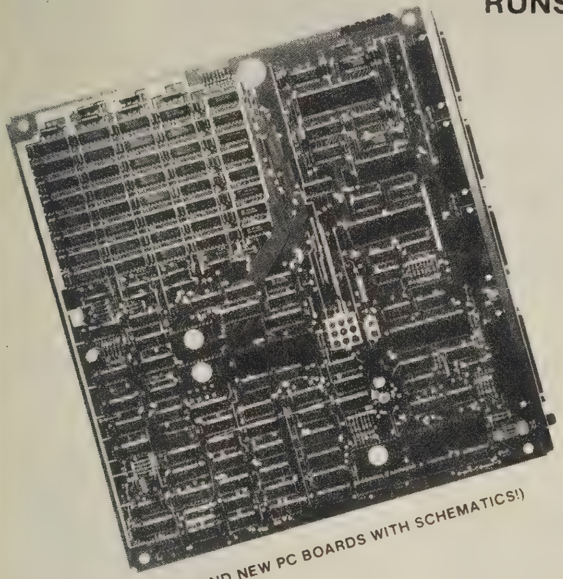

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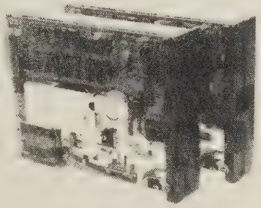

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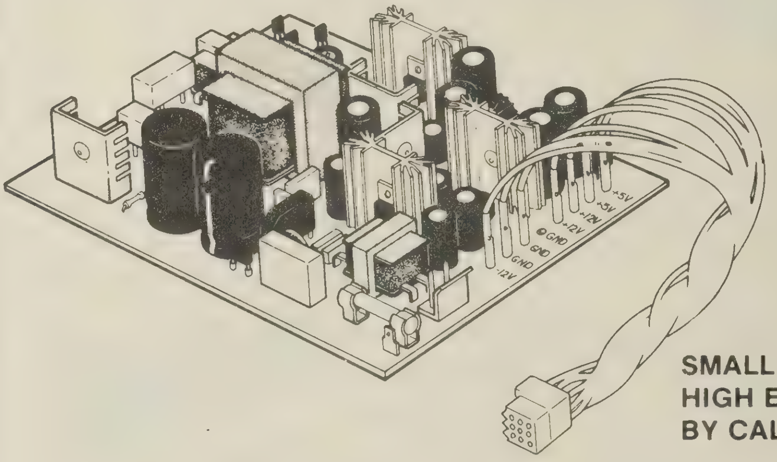

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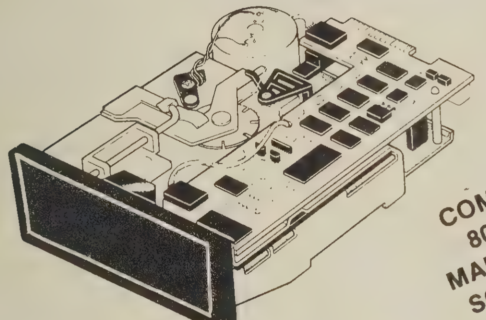

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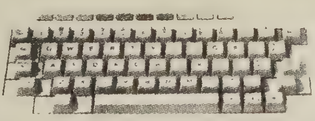

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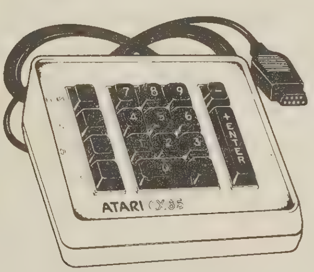

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The Wizard's Keep

SMAL/80

(a review)

Glen Popiel, WA4FTX

Last month, I talked about assemblers and machine language. While there really isn't anything faster and more compact than a machine language program, there are ways to strike a happy medium between assembly language and the higher level languages such as BASIC and FORTRAN.

Several years ago, I was able to play with an interesting language, called BASEX. BASEX was a direct cross between assembler and BASIC. While BASEX did have possibilities, it had shortcomings that made it hard to work with.

Enter SMAL/80 , a structured macroassembler from CHROMOD Associates. SMAL/80 is for CP/M-80 systems and produces code for the 8080, the 8085 and the Z-80. The promotional literature offers a special version for the Apple II and IIe which produces both Z-80 and 6502 object code.

SMAL/80 is that perfect cross between a higher level language and assembly language, allowing you to create compact and fast programs without the tremendous time consumption of writing it in assembler. SMAL/80 replaces the standard mnemonic instruction codes with a more easily understood command. For example, to subtract 50 from the A register, the 8080 instruction would be SUI 50. With SMAL/80, the command would be A = A-50. Which would you rather use? The manual claims that SMAL/80 programs have been clocked as being five percent faster than its assembly language counterpart.

SMAL/80 originated in the Bell Laboratories as SMAL, an assembler created for programming the 8080, way back in 1974. Continued enhancements have led to today's version of SMAL/80. SMAL/80 was created mainly because of its designer's dissatisfaction with the assembly language mnemonics selected by INTEL for the 8008, the predecessor to the 8080.

A SMAL/80 source file reminds me of a PASCAL or C program. The standard structured programming concepts of BEGIN-END, If-THEN-ELSE, and LOOP-REPEAT have been integrated into SMAL/80, allowing a great deal of programming flexibility. I am not a lover of PASCAL, but I do like some of the techniques that such structured programming embodies. I just wish that structured programming purists would not be so much against the GOTO statement. SMAL/80 does include the GOTO statement, however the use of it is discouraged.

SMAL/80 also uses the same form of notation that you would find in PASCAL or C. Each level of a loop can be indented in a format very much like a C program. Its obvious that the boys in Bell Labs all think alike.

SMAL/80 is not so much of an assembler as it is a compiler. Your SMAL/80 source code is passed through a macro processor to expand the macro definitions, and then compiled into machine language. I really don't see much of a difference between the two, but then, what do I know?

The disk that came with the review package was chock full of stuff. In addition to the macro processor and SMAL/80, a whole slew of sample programs were included. A file compare utility , and a new version of the CP/M load program were also included. The disk also had several macro definition files. These files contained the definitions necessary for SMAL/80 to translate 8080, 8085 and Z-80 mnemonics to SMAL/80 code. This allows you to transfer your existing source files to SMAL/80 with a minimum of difficulty. Also offered with SMAL/80 is a utility to convert Microsoft .REL files to SMAL/80 format, but this utility was not included in the review package.

Also included in the package was a book, entitled Structured Microprocessor Programming. This book was written by the folks at CHROMOD and is probably the best instructional book for developing good assembly language programming techniques that I have come across. While the book is aimed for the complete novice, it can also be used by the experienced programmer to aid in learning SMAL/80. In fact, the book is far better than the manual when it comes to teaching you how to use SMAL/80. The book stresses when it come to programming, there is only one way to gain skill and expertise. That way is with practice, practice and more practice. In addition to introducing you to SMAL/80, this book is a good text on the science and methods of assembly language programming in general.

The SMAL/80 User's Manual is printed in letter quality print on 8½ by 11 inch paper, punched for a three ring binder. What was missing was the binder itself. Is everyone on a binder conservation kick or something? This is the second month in a row that the program I reviewed didn't come in a binder. The manual contained the standard licensing agreement, although this one was done with a little more common sense than usual and concentrated mainly on illegal copies.

The manual is more of a reference manual than an instructional guide, and I found the book that I mentioned earlier a far better way to learn SMAL/80. The manual includes a cross reference table to translate between SMAL/80 and 8080, 8085, and Z-80 code.

Also contained with the documentation was a SMAL/80 pocket user's guide. I don't know about you, but I love pocket reference guides. I hate to page through a big manual just to find the syntax for a single command. By being small, it also leaves more room for the rest of the mess on your desk.

The logically selected commands are what give the SMAL/80 assembler its main appeal. I would rather type A = 0 than MVI A,0 any day of the week. Three months from now, I know I would remember what the SMAL/80 command does, but I doubt seriously that I could remember the 8080 command. SMAL/80 allows use of the IF-THEN-ELSE and other structured programming constructs. Your programs can be written in free-form, and SMAL/80 supports conditional compilation, allowing you to bypass the compilation of a section of code. You would use this option to create different configurations of a program while still using the same basic source file. There are no cramping format restrictions in SMAL/80 that yo I am just dealing with a high powered assembler and not PASCAL.

The linker used by SMAL/80 is actually a part of the compiler. The linker is easy to use, as it uses the same commands as does the compiler. The output of the linker can either be in the SMAL/80 relocatable object format or in standard INTEL HEX format. The linker really does not seem to be anything more than an extension to the compiler itself, making learning how to use it a snap.

The real powerhouse of this package is not the SMAL/80 compiler and linker, but in the macro processor that comes with SMAL/80. This program expands the macros used in the source file into SMAL/80 statements that are recognizable to the compiler. This macro processor is a complete package in itself, making is extremely versatile and allows you to virtually create your own assembly language translator simply by creating the macro definitions needed to make the translations. A set of the macro definitions required to translate 8080, 8085 or Z-80 source files is included with the SMAL/80 package.

As I mentioned earlier, SMAL/80 comes with a bunch of example files. A description of these examples and what they are supposed to be doing is included in the user's manual. I found these examples and the descriptions to be very confusing. Rather than have you type in the commands necessary to compile these examples, a series of submit files is provided to you. While the demonstration proceeds in a reasonably orderly fashion, it is easy to get confused, and I found myself trying to figure out why something was done in such and such a way. To make things worse, the examples did not always follow the book exactly. Having been around assembler for a while, it did not take me long to figure out where the differences were. Still, it was disconcerting to get lost in such a manner.

I really did not like the submit procedure at all. As it progresses, you are forced to view files that are printed for you in the book and you spend much of your time quitting from ED, the CP/M text editor. Why they chose to use ED to show you the files is beyond me. A simple TYPE command would have been far superior.

Complexity seems to be the key word in the examples. The example chosen to introduce you to SMAL/80 is a bubble sort routine. While this routine may be valuable to me in the future, its complexity is not appropriate for an introductory session. At times, I felt like I was a student pilot who had been given the controls of a 747 and told to land it in a blizzard...after everyone else had parachuted to safety. My advice to you is to ignore the examples completely and do your own thing.

Overall, I found the power inherent in SMAL/80 to be very appealing and worth sloshing through the examples. While SMAL/80 may be a bit on the complex side for me, being the unstructured programmer that I am, I feel that in time I could probably get used to using all those semicolons and brackets. If you're into C or PASCAL, you'll do just fine in SMAL/80. There's no doubt in my mind that SMAL/80 is a vast improvement over standard assembly language. While I don't recommend SMAL/80 for the novice programmer, an experienced programmer should be able to write some pretty powerful stuff using SMAL/80.

Best of all, SMAL/80 is not all that expensive. The full blown version sells for $149.95 while the scaled down version that does not accept Microsoft .REL files is only $129.95. Unless you do a lot with Microsoft .REL files, get the economy version. The version for the Apple II and IIe is called SMAL/80X65 and sells for $169.95. This version requires that your Apple have a Z-80 card and CP/M. You can get SMAL/80 from:

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You can send your comments and suggestions to me at P.O. Box 9447, Birmingham, AL. 35215. **CTM**

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TECH:ProDOS

Number One in a Series

Curt Rostenbach

"Who is this column for?"

The new Apple operating system for the Apple II series of computers expands the programming horizons in two directions at once. In one direction the commands and abilities of programming with Applesoft BASIC have been enhanced, and in another direction the machine language interface to the operating system has been defined and designed to allow as much freedom and services as possible to the assembly language programmer.

I intend to use this column to pass on technical information in both directions for the aspiring ProDOS programmers. Apple Computers, Inc. has sold over two million Apple II computers since their introduction. That does not mean there are two million computer programmers for the Apple II computers. In the early days of microcomputers, virtually all owners were programmers, or persons wanting to learn to program. Today most owners are buying computers as problem solvers, word processors, or game machines. For a while the watchword was "computer literacy", the meaning of which is still under debate. In the early days, it was predicted that the entry level programmer would become a thing of the past as everyone would soon have their own computer and would be doing their own programming. At the microcomputer conference that I heard that, a person in the audience stood up and pointed out that everyone in the audience could write, but how many would be novelists?

I am aiming this column for the computer novelist programmer.

I have spent years trying to understand the Apple II computer and it's operating system in extreme detail. I call myself a professional programmer because it pays the bills. I have always shared my knowledge rather than hoarded it as other programmers I know have. The reason I'm usually given why they do it, is because if they shared, their services would not be unique. With 2,000,000+ Apple computers in the world, anyone programming is unique.

Computer programming is unlike and like many fields simultaneously. In some areas it is so new and startling that even the "professionals" cannot keep up. New modes of thought have to be incorporated into the imagination that programs are developed in. At the same time, the programs must function, and be designed to operate in a predictable and maintainable manner. For this reason, I really prefer to refer to myself as a "software engineer".

Engineers from other fields have sets of solutions to various problems that they use to solve the problems of the future. I have my own set of building blocks I have developed over the years. While this column will not necessarily be a show place for them, I will be showing and building a few here. I will also try to serve as a guide to the features and abilities of the Apple II computer and the ProDOS operating system.

It will not be a class on how to program, I will expect the reader to already know how. This column will be more like reference material.

The Apple computer and ProDOS operating system have quite a few undocumented features. I will try and have the latest and most correct information in this column. I'm not going for the "Gee Whiz" unknown features, but solid foundations of future software projects. And since this is a column for sharing, I will appreciate any corrections, suggestions, and subjects.

Next month, "Extracting Information from a CATALOG", will build on the routine presented in "A Pro Looks At ProDOS part 6".

If you have any input, suggestions or comments plese send it to me at:

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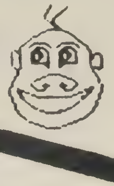

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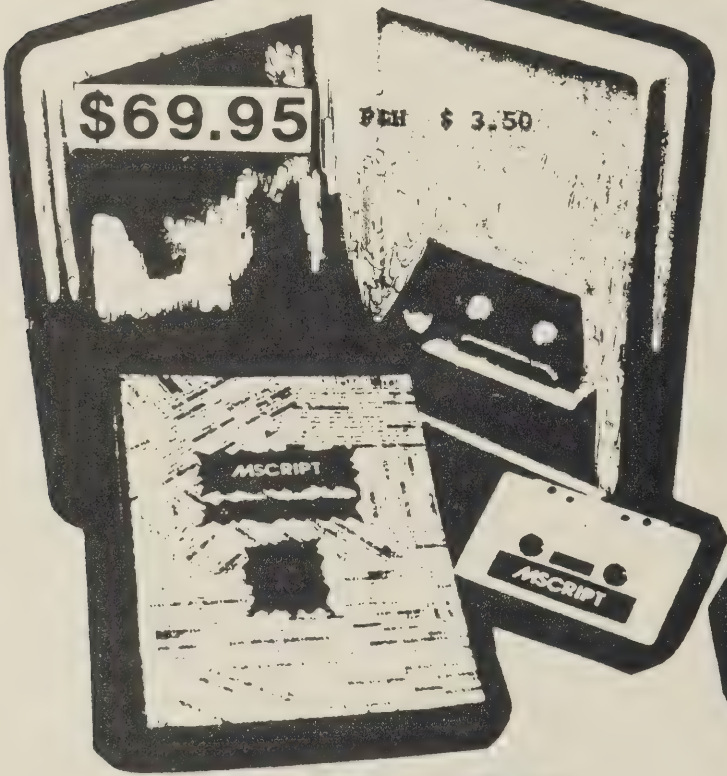

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Modem Musings
Noisy Notes

Lance F. DiNonno

Now we're going to explore the world of noisy telephone lines and some things modem manufacturers can do about it through innovative electronics.

First we need to understand the nature of the problem. The definition of noise is simple; noise is anything that isn't signal. To illustrate what we are dealing with here I'll create a scenario analogy somewhat akin to the adventure games first made popular by Adventure International in Orlando.

You are an Observer 1st Class in the Kingdom of Nirvania Coast Guard. You are responsible for keeping track of the activities of a fleet of submarines sent by a hostile adversary, The Duchy of Trivia, to spy on the construction of new coastal defenses by Nirvania. Trivia is located far to the north and these submarines were configured to operate in and around the ice floes and snow fields and are painted white. Your observing position has a good view of the sea and you begin to collect data.

The sea is calm and you have no problem keeping track of the white periscopes contrasted against the dark, flat sea. You have been instructed to count how many times the periscopes go up and down and record the data in your log. All goes well until a storm starts to brew and the sea becomes choppy with the waves reaching higher and higher until it becomes difficult to distinguish the periscopes from the wave peaks. Fortunately you have observed that the periscopes always come up in the same place so by looking there you continue to be able to keep count. At some point the sea becomes so confused you just can't distinguish between the waves and the periscopes. Not to be overwhelmed by this problem, you construct a device out of wood with slits positioned precisely in the relative position of the periscopes so you can look for the white shaft without the confusion of the surrounding sea. You're quite pleased with your self as this scheme works and you bundle up against the wind and continue to record the count. You are interrupted as a group od sailing craft breaks their moorings and puts their white masts in your field of view confusing your count once more. Still not to be defeated by this problem, you remember that the periscopes appear at precisely the same time every time. Using this information you adjust the filter so it opens the slits only at the time when a periscope is expected to appear. You continue to record the data but with some errors due to all the "noise" confusing things.

By now all of you sharp folks have figured out what I have been getting at and as we leave Trivia na Nirvania to their squabbles we hope our observer doesn't drown in the tidal wave soon to come.

The periscopes were the data, the waves were "white" noise and the masts were examples of specific noise which we will discuss further. The noise filter device was your brain with its encumbent data processing capability.

Noise I have observed on telephone lines is quite varied in its characteristics. White noise is the hissing static or rushing sound you hear especially when the actual circuit is a microwave link. Then there are the clicks and pops that show up on an oscilloscope as fast rise time pulses which can confuse modem demodulate circuitry expecting a data bit at the time the click or pop occurs. Yet another very difficult noise type is the echo found, again, on microwave circuits. Generally the cleanest connections are made on ATT direct or WATS lines. The worst are the alternate long distance services like ITT, MCI, SPRINT and others making heavy use of questionable quality microwave links. Another problem area is the remaining small telephone companies across the US that are still using antique switching equipment left over from the fifties

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Modern modem design incorporated in product directed to commercial use always contains some kind of noise discrimination scheme. Digital techniques became common in the 70's in modems costing $10k plus and taking up an entire equipment rack or desk top. Consumer grade modems available today usually have minimal or no noise discrimination at all. I recently had an MI Squared acoustic coupled 300 baud modem, made in 1972, containing all discrete components with decent analog filtering, outperform a Hayes direct connect Smartmodem, on a slightly noisy line. I recently sold this modem for $30 to a fellow who probably has no idea what a great modem buy he made. For the high prices one has to pay for that Hayes product I should expect much better performance in a noisy environment.

Modern digital filtering techniques, made possible by the availability of inexpensive, powerful microprocessors, usually involve some kind of slice sampling technique. The smaller the slice of the signal taken, the bigger the program and memory required, and the more complicated the discriminator. The real breakthroughs in this area have come through application of very sophisticated mathematical algorithms for error detection and correction to modems in the consumer price range. CTS Datacom division makes one such modem referenced earlier, which uses these techniques to achieve performance in high noise line environments which is nothing short of outstanding. There will be other offerings in this price range soon which are sure to compete with CTS but for now I have seen nothing under $3000 which comes close. CTS suggested List Price is $455 for the 212AHC and 212AH, an excellent buy.

Beware of the specs game. Just like Hi Fi electronics, specs don't mean a thing. Manufacturers will tout noise error rate specs which look attractive but these are usually obtained using white noise generators which don't reflect the real world of line noise we explored earlier. Ask the dealer to give you opportunity to see the modem in action, perhaps take it home to try out, before buying. At least have the dealer agree to money back in some short time period if not satisfied.

In the next edition of Modem Musings we will discuss "smart" modems and the different variations available on todays market.

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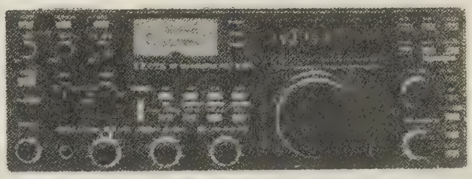

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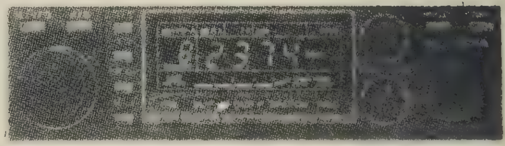

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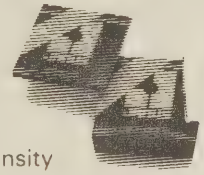

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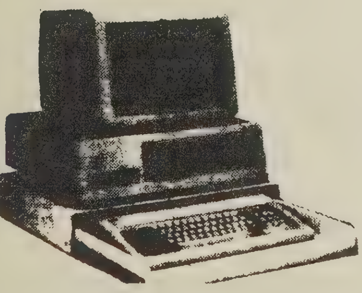

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The ABCs of Packet Radio

Phil Anderson, W0XI

This tutorial provides a brief description of packet radio. Packet, while similar to RTTY amd Amtor communication modes in that computers and radios are linked together, is quite different in may respects. In order to explore the differences as a way of explaining packet radio, let's begin with a review of a typical computer — based RTTY system.

As shown below, the RTTY system consists of your computer, a radio modem usually referred to as a TU (terminal unit) and the station transceiver. The TU can be of two types, smart or dumb. If it is dumb, then all it does is convert digital levels from the computer into audio tones to be inserted at the transceiver mic jack. In the other direction, receiving, it translates received tones back to digital signals that the computer can understand. As such the TU is similar in function to a telephone modem, except that it operates half — duplex. When a dumb TU is used with a computer, the computer must have a program that converts the digital signals received into a format for display. Signal speed and mode must be taken into account. For example, if you are operating RTTY at 60 WPM, then the program must convert that for display or printing. If you are operating AMTOR, then the computer must implement the AMTOR rules (protocol) and control display of received information accordingly.

If your TU is smart, then it has a microcomputer inside and takes care of all code conversions and protocol operations when operating AMTOR. Smart TUs generally communicate with the computer through a serial channel called the RS-232 port. The levels may be RS-232 or TTL compatible but the serial communications format is always followed. ASCII code is used at a baud rate of either 110 or 300 for RTTY in the HF bands.

Of the two forms a RTTY computer-based station can take, the smart TU form is closest to that of a packet station. A typical packet station consists of a computer that can "talk" RS-232, a TNC (Terminal node controller) and the transceiver. The TNC is substituted for the TU.

The TNC is a very special device; it is very smart. The jobs it must do are:

1.) Control sending and receiving of data,
2.) Package data into bursts,
3.) Generate the packet data into AFSK tones,
4.) Receive and demodulate packets,
5.) Act as a relay station for two other packet stations on request,
6.) Implement the packet rules (protocol).

That is quite a list of things to do. Hence, the TNC usually takes the form of a high-grade TU that includes special ICs, memory chips, and a fast microcomputer. This is true of the standard TNC currently in the marketplace, the TAPR TNC, Tucson Area Packet Radio Unit.

Now that we have the equipment in mind, how do we initiate and operate a packet station? How do we start a QSO? The station starting a QSO sends out a packet called a "connect request." He does this by specifying his call and the call of the station he desires to talk to and then sends this request. The request will be sent repeatedly "N" times per his request. Once a contact has been made the response

```
*** connected to (call sign)
```

will be displayed at each station. Then the QSO can proceed. When the operator wants to end the conversation, he can send a "disconnect request." Once this request is acknowledged by the other station

```
***disconnected
```

will appear on each station screen.

This procedure for a QSO and other procedures make up a list that is considered the rules or protocol for packet radio. The protocol chosen by most packet users is identifies as AX.25, and this name and most of the protocol come from the commercial protocol labeled X,25. At the heart of this protocol for packet is the definition of the format of the packet. Let's take a look.

Briefly, each packet is made up of a preamble, a data section, and an error-checking section. The preamble is called a header or the header information. This can consist of station calling, station called, and other information. The data is just that, data. The error section is called the frame check sequence, FCS. The header is used to direct communications and the FCS is used to detect errors in communication. As a simple example of how the packet is used, let's return to our QSO initiation operation. One station initiates a QSO by sending a "connect request" packet to the called station. The packet will include the call-sign of the called station, and the calling station, but no data is necessary. The FCS will be transmitted too. When the intended station receives this packet, it will check to see that the FCS compares with what it calculates for the received packet. If so, it sends a "connect request acknowledgement" and the two stations become connected., Finally, why go to all this trouble and technical detail to just communicate on local VHF computer-to-computer? First of all, you get errorfree communications, secnd, you are using the same format as other so there IS someone to talk to, and third, many users can use the same frequency at the same time!!! This is probably the greatest mystery of packet radio. How can this be possible?

Simultaneous useage of the frequency is possible because the packets are sent in short bursts, leaving the channel open for others. All users are accommodated by the fact that collisions are retransmitted. Each station retransmits information while telling the station it is talking with that the last transmission was not received correctly. Random delays are used for each station so that repeat collisions are effectively reduced to zero over a short period of time.

In summary packet is different than RTTY in that it:

1.) Has error detection,

2.) Repeats mutilated messages on request, hence error-free,

3) Shares the frequency with other stations.

Happy Hamming....

Phil Anderson, W0XI
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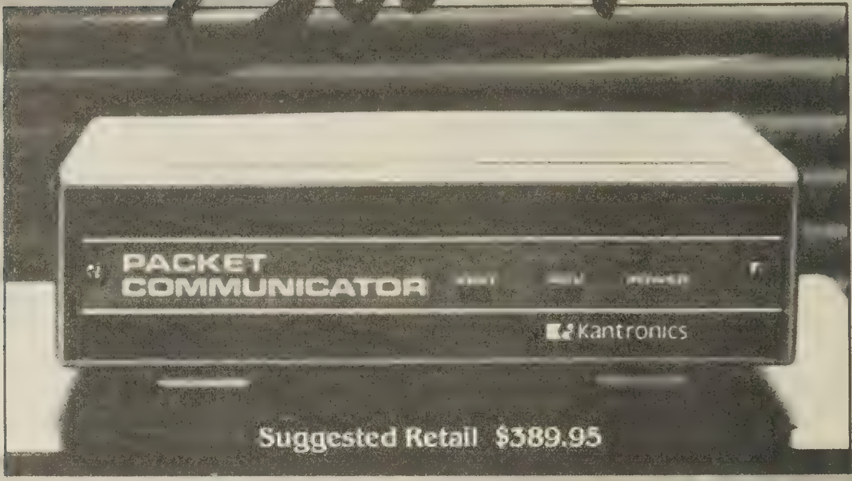

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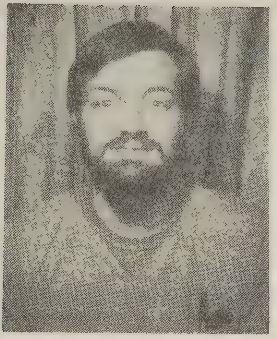

James John Pittman KA4PDZ

PC jr.

The endeavor of this and future articles is to cover the world of the IBM PC, PCjr, and IBM compatibles. I am not saying that I am an expert on this subject, but I intend to try and impart information that I came by the hard way. In this way I hope to make it easier for someone else.

Since this is my first article, it's going to be somewhat of a "Junior" article. A lot of people have been going out and buying the PCjr since the price came down, thinking that now they have an inexpensive name-brand computer only to find that it looks like it will cost them as much in the long run. The PCjr comes with only one disk drive and 128K of memory. Some of the stores will include sample programs such as PFS:WRITE or IBM Filing Assistant with your PCjr, but you don't get quite what you thought you would. (NOTE: If you haven't bought a PCjr yet and you know someone that works for Northwestern Telecom, check with them about getting a PCjr, because Northwestern offered to its employees to pay $500 on each PCjr and the employee only pays $200. That is a pretty nice employee benefit. There is a Birmingham company that has offered to pay 3/5 of the price for an IBM PC-AT for its employees, but I don't know which company it is yet.) These people are then told that if they want to run a large program like Lotus 1-2-3 or Home Accountant Plus, that they must purchase a cartridge at an inflated price of, in most cases, better than $500 a piece. Don't despair if you think you are in this boat, there are other, cheaper ways to run large programs than buying cartridges. One of these ways is what I am going to discuss in this article.

What you should consider is running regular IBM PC software on your Junior. You say you have already thought of that, but the problem that stopped you was that you needed a second disk drive and more memory. There is software available that will make your PCjr think it has a second drive, but you say that still doesn't help you about memory. There are also memory expansion boards available for the PCjr and IBM PC. The company that makes the boards is Tecmar, Inc. of Solon (Cleveland), Ohio. There are probably other companies that make memory expansion boards for the IBM PC and PCjr, but this company is the best known. Tecmar has announced that a second disk drive will be available for the PCjr later this year. When you buy a memory expansion board from Tecmar, they include the software to make you PCjr think it has a second disk drive.

Tecmar has several boards to choose from depending on how much memory you want/need (I discuss that aspect later in this article). I have listed some of the configurations and suggested retail prices for the boards available for the PCjr below:

jrCaptain - 0 to 128 KBytes memory (0 to 512 KBytes with 256 Kbit RAM chips) / Parallel printer port / Clock-Calendar with battery back-up / Treasure Chest of Software Suggested Retail Price: $235 to $395 depending on memory amount.

jrCadet - 0 to 512 KBytes memory / Parallel printer port / Clock-Calendar with battery back-up / Treasure Chest of Software Suggested Retail Price: $195 to $595 depending on memory amount.

jrWave - 0 to 256 KBytes memory (0 to 640 KBytes with 256 Kbit RAM chips) / Electronic disk / Memory diagonstic Suggested Retail Price: $295 to $495 depending on memory amount.

jr2nd Mate - Parallel printer port / Clock- Calendar with battery back-up / Printer buffer / Settime software Suggested Retail Price: $145

Tecmar, Inc. 6225 Cochran Road Solon (Cleveland), Ohio 44139-3377 Phone: (216) 349-0600 Telex: 466692 or For the Southeast Micro National 240 Oxmoor Circle, Suite 105 Birmingham, AL 35209 E. T. Brown, Manager Phone: (205) 942- 2822

You noticed that the Treasure Chest of Software was mentioned with most of the boards. It is divided into several categories some of which are: Information Management; Time Management; System Improvements; Hardware Diagnostics to name a few.

There is a program in this software that is called MEMDISK.EXE and is used to set up a second disk drive in memory. One thing to remember though, is that you must set aside a portion of your useable memory to run this program and it takes whatever amount of memory plus an additional 5K to use as your second disk drive. This means that you should consider getting at least 256K of memory to expand your memory with. The reason you should consider at least 256K is if you want to run a large program like

Lotus 1-2-3, then you need at least 230K just for Lotus 1-2-3. Then you have to consider how much memory you need to use for your spreadsheets. If you add 256K, this means that you have 384K of useable memory before you load in any software. By the time you have loaded DOS and MEMDISK (depending on the memory you have designated for your second drive) you will have less memory with just a 128K expansion than if you did a 256K expansion. I know that when you start looking at the up-front costs and the costs for the 256Kbit chips (price of $15 to $55 a piece) your going to say is this really cheaper. It will be when you consider that if you use the cartridges that it would cost about this much for each cartridge plus you can probably recoup some of your money by selling your 64Kbit chips to someone that is looking for additional memory.

If you decide to buy a Tecmar board, but purchase it local instead of ordering it from Tecmar, then when you get it be sure to check the Memory Banks to see if the memory chips have been soldered in or if they are in sockets. If they are in sockets you will have no problems, but if they are soldered it would void your warranty to remove them and replace the chips. DON'T tell the store that you want to have sockets installed, because they will, in most cases, tell you that it will cost somewhere between $50 to $150 when it just costs shipping and a long distance call. If your board is not socketed this is what you should do. Call Tecmar and ask for Jill Barber. Tell Jill that you want to send your board back to have sockets installed in it. Jill will give you a Return Modification Authorization number (RMA) that you must put on the outside with the address. Tecmar guarntees a 72 hour turn around time from the time they receive your board. All you pay is the telephone call and shipping one way. When you ship your Tecmar board back, be sure to include your Tecmar manuals and Tecmar Treasure Chest of Software diskette, as Tecmar will send you back the latest edition of software. This also means to include your power cord and screws for connecting the Tecmar board to the side of you PCjr. The Tecmar Manual tells you alot of good information, but it answer. If you call Tecmar with a problem you get a recording after asking for Tech Support that tells you "All our Tech Support people are busy, if no one is free to handle your call within 2 minutes, you will be transfered to the Tecmar Message Center." Most times you will leave a message with the Message Center and you might get a call back late the following afternoon. They may not be able to tell you how to correct the problem, so you might want to check with someone you know has a board to see if they have had similiar problems. I am going to discuss one of the problems in the manual. This one concerns the proper way to load the MEMDISK.EXE program in the PCjr and will clear up the mud a little about your memory and the AUTOEXEC.BAT program.

The AUTOEXEC.BAT program is an automatic execution batch file program that will automatically load certain specified programs and information into your PCjr. When you add the Tecmar memory expansion board you must first run a program called CONPCJR.EXE. This tells your PCjr to look for more memory, but when you put this program in to your AUTOEXEC.BAT program there are a few parameters that you must consider. First if you look in your manual you will find out that the video buffer for your PCjr is placed at the end of your 128K of memory and that when you put it in your batch file you must tell the PCjr to move it to the end of the memory you have added. This is done by putting a -P2 behind the program name on the first line in your batch file and should look like this:

```
CONPCJR -P2
```

The other parameter is whether or not you want to run the MEMDISK.EXE program. If you do then you must tell the PCjr to look for a second disk drive. This is done by placing a -D2 behind the -P2 on the first line and looks like this:

```
CONPCJR                    -P2                    -D2
```

The next two lines of you batch file are quite easy in explainations. The second line is DOSTIME.EXE and is for loading the Date/Time from the clock/calendar chip on the Tecmar board. The third line is MODE 80 and tells your PCjr to load the 80 columns format. The fourth line is optional and is for setting up the Memdisk or second disk drive in memory. The Tecmar manual gives a long line that is suppose to be put in the batch file, but I am not going to display it as it does't work. The proper way to input the line is decide how much of the available memory you wish to set aside for the second drive up to 360K. When you have decided that, you must next decide what drive designation you want to give the second drive (i.e. drive B or C). When you have decided this you are ready to write the fourth line and it should look something like this (NOTE: I am designating drive B and 65K of memory for Memdisk):

```
MEMDISK B: -BUF65
```

The total AUTOEXEC.BAT program with the optional fourth line should look like this:

```
CONPCJR -P2 -D2
DOSTIME
MODE 80
MEMDISK B: -BUF65
```

I suggest that you look at the Wordstar word processor program as it is helpful and easy in setting up AUTOEXEC.BAT files.

James John Pittman
424 Exeter Drive
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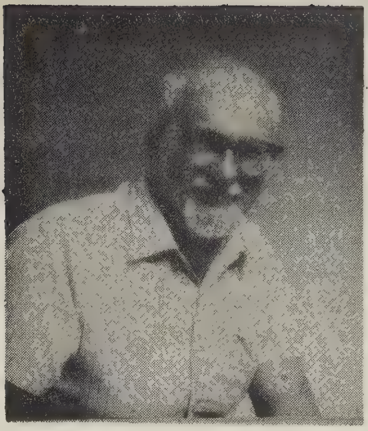
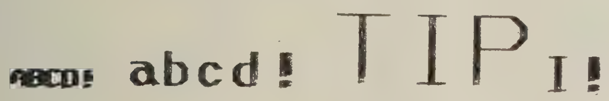
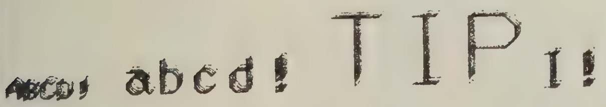
Dave English



Here's a way to emphasize printing on the 1520 by bold face or 3-D. Such capabilities are not controlled by a simple command on the 1520, instead you have to control the position of the pen by using the plotting commands. Two examples are shown below. The first is a version of bold face made by printing the letters 6 times and moving the pen one pixel to the right between prints. The 3-D in the second has the same right shift as the first plus a shift up at every second print.



```
100 CLOSE4.OPEN4,6 PRINT#4
105 CLOSE1:OPEN1,6,1
110 CLOSE3.OPEN3 6,3:PRINT#3,1
115 FORJ=0TO5
120 PRINT#4, ABCD!".
130 PRINT#3,2.
140 PRINT#4, abcd! ".
150 PRINT#3,3;
160 PRINT#4, TIP".
170 PRINT#3,2;
180 PRINT#4, I!"
190 PRINT#3,1;
200 PRINT#1 I"
210 PRINT#1, R".J,40
220 NEXTJ
```



```
100 CLOSE4.OPEN4,6:PRINT#4
105 CLOSE1:OPEN1,6,1
110 CLOSE3:OPEN3,6,3:PRINT#3,1
115 FORJ=0TO5
120 PRINT#4, ABCD!";
130 PRINT#3,2;
140 PRINT#4, abcd! ".
150 PRINT#3,3;
160 PRINT#4,"TIP";
170 PRINT#3,2;
180 PRINT#4, I!"
190 PRINT#3,1;
200 PRINT#1, I"
210 PRINT#1,"R",J,(40+(J/2));
220 NEXTJ
```

A quick summary of the effect of the code; — File 4 is used for ordinary printing of letters. File 1 is used for plotting by moving the pen to the pixel coordinates specified in a PRINT1 command; the pen can be up or down. File 3 is used to choose the size of the letters printed; there are four sizes available. PRINT3.1 chooses "normal" size such as is used in the listing. Size 2 is twice as big — — VEDI, and size 3 used as PRINT3.3 is 4 times standard — VIC. In line 200, the origin (0,0) for plotting is set to the current location of the pen by sending the letter "I" to file 1. In line 210, the pen is pulled up off the paper by the "R" and then the pen is moved to the right however many pixels correspond to the current value of the loop index variable I (this is not the same as the letter "I" in line 200) and then the pen moves up a number of pixels equal to the last parameter in the PRINT1 command. This a constant 40 pixels in the first example just to get the pen back to the same position as the previous line. In the second example it is incremented every second pass through the loop to get the 3-D effect.

Dave English
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HM6264LP-12	8192 x 8 (120ns) (cmos)(LP)	24.95

LP = Low Power Qstat = Quasi-Static

DYNAMIC RAMS

TMS4027	4096 x 1 (250ns)	1.45
UPD411	4096 x 1 (300ns)	1.95
MM5280	4096 x 1 (300ns)	1.95
MK4108	8192 x 1 (200ns)	.49
MM5298	8192 x 1 (250ns)	.49
4116-20	16384 x 1 (200ns)	.79
4116-15	16384 x 1 (150ns)	.99
4116-12	16384 x 1 (120ns)	1.49
2118	16384 x 1 (150ns) (5v)	3.95
4164-25	65536 x 1 (250ns) (5v)	2.00
4164-20	65536 x 1 (200ns) (5v)	2.22
4164-15	65536 x 1 (150ns) (5v)	2.50
41256-20	262144 x 1 (200ns)	12.95
41256-15	262144 x 1 (150ns)	15.95

5V = Single 5 Volt Supply

EPROMS

1702	256 x 8 (1us)	3.95
2708	1024 x 8 (450ns)	2.49
2758	1024 x 8 (450ns)	5.90
2716	2048 x 8 (450ns) (5v)	2.95
2716-1	2048 x 8 (350ns) (5v)	3.95
TMS2516	2048 x 8 (450ns) (5v)	3.95
TMS2716	2048 x 8 (450ns)	6.95
TMS2532	4096 x 8 (450ns) (5v)	3.95
2732	4096 x 8 (450ns) (5v)	3.95
2732 A-4	4096 x 8 (450ns) (21v)	3.95
2732 A-35	4096 x 8 (350ns) (21v)	3.95
2732 A	4096 x 8 (250ns) (21v)	5.95
2732 A-2	4096 x 8 (200ns) (21v)	8.95
2764	8192 x 8 (450ns) (5v)	4.95
2764-25	8192 x 8 (250ns) (5v)	5.95
2764-20	8192 x 1 (200ns) (5v)	8.95
TMS2564	8192 x 8 (450ns) (5v)	9.95
MCM68764	8192 x 8 (450ns) (5v) (24-pin)	17.95
MCM68766	8192 x 8 (350ns) (5v) (24-pin)	19.95
27128-45	16384 x 8 (250ns) (5v)	14.95
27128-30	16384 x 8 (300ns) (5v)	16.95
27128-25	16384 x 8 (250ns) (5v)	18.95
27256-25	32768 x 8 (250ns) (14v)	79.95

5v = Single 5 Volt Supply

74LS00

74LS00	.23	74LS125	.49	74LS260	.59
74LS01	.24	74LS126	.49	74LS266	.54
74LS02	.24	74LS132	.59	74LS273	1.45
74LS03	.24	74LS133	.59	74LS275	3.30
74LS04	.23	74LS136	.39	74LS279	.49
74LS05	.24	74LS137	.99	74LS280	1.95
74LS08	.27	74LS138	.54	74LS283	.69
74LS09	.28	74LS139	.54	74LS290	.89
74LS10	.24	74LS145	1.15	74LS293	.89
74LS11	.34	74LS147	2.45	74LS295	.99
74LS12	.34	74LS148	1.35	74LS298	.89
74LS13	.44	74LS151	.54	74LS299	1.70
74LS14	.59	74LS153	.54	74LS323	3.45
74LS15	.34	74LS154	1.85	74LS324	1.70
74LS20	.24	74LS155	.59	74LS352	1.29
74LS21	.28	74LS156	.59	74LS353	1.29
74LS22	.24	74LS157	.64	74LS363	1.39
74LS26	.28	74LS158	.59	74LS364	1.99
74LS27	.28	74LS160	.69	74LS365	.49
74LS28	.34	74LS161	.64	74LS366	.49
74LS30	.24	74LS162	.69	74LS367	.44
74LS32	.28	74LS163	.64	74LS368	.44
74LS33	.54	74LS164	.69	74LS373	1.35
74LS37	.34	74LS165	.94	74LS374	1.35
74LS38	.34	74LS166	1.90	74LS377	1.35
74LS40	.24	74LS168	1.70	74LS378	1.13
74LS42	.49	74LS169	1.70	74LS379	1.39
74LS47	.74	74LS170	1.45	74LS385	1.85
74LS48	.74	74LS173	.69	74LS386	.44
74LS49	.74	74LS174	.54	74LS390	1.15
74LS51	.24	74LS175	.54	74LS393	1.15
74LS54	.28	74LS181	2.10	74LS395	1.15
74LS55	.28	74LS189	8.90	74LS399	1.45
74LS63	1.20	74LS190	.89	74LS424	2.90
74LS73	.38	74LS191	.89	74LS447	.38
74LS74	.34	74LS192	.79	74LS490	1.90
74LS75	.38	74LS193	.79	74LS624	3.99
74LS76	.38	74LS194	.69	74LS640	2.15
74LS78	.49	74LS195	.69	74LS645	2.15
74LS83	.59	74LS196	.79	74LS668	1.65
74LS85	.69	74LS197	.79	74LS669	1.65
74LS86	.38	74LS221	.89	74LS670	1.45
74LS90	.54	74LS240	.94	74LS674	9.60
74LS91	.89	74LS241	.99	74LS682	3.15
74LS92	.54	74LS242	.99	74LS683	3.15
74LS93	.54	74LS243	.99	74LS684	3.15
74LS95	.74	74LS244	1.25	74LS685	3.15
74LS96	.89	74LS245	1.45	74LS688	2.35
74LS107	.38	74LS247	.74	74LS689	3.15
74LS109	.38	74LS248	.99	74LS783	23.95
74LS112	.38	74LS249	.99	81LS95	1.45
74LS113	.38	74LS251	.59	81LS96	1.45
74LS114	.38	74LS253	.59	81LS97	1.45
74LS122	.44	74LS257	.59	81LS98	1.45
74LS123	.79	74LS258	.59	25LS2521	2.75
74LS124	2.85	74LS259	2.79	25LS2569	4.20

CRT CONTROLLERS

6845	11.95	8275	28.95
68B45	18.95	7220	38.95
HD46505sp	11.95	CRT5027	18.95
6847	10.95	CRT5037	26.95
MC1372	6.90	TMS9918A	36.95
68047	23.95	DP8350	48.95

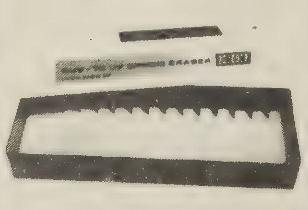
DISC CONTROLLERS

1771	14.95	2797	54.95
1791	21.95	6843	33.95
1793	25.95	8272	18.95
1795	21.95	UPD765	18.95
1797	21.95	MB8876	23.95
2791	49.95	MB8877	25.95
2793	49.95	1691	6.95
2795	54.95	2143	6.95

UV ERASERS

QUV-T8/1 $49.95

ECONOMY Model



- Erases 15 EPROMS in 20 minutes
- Plastic Enclosure

6500

1 MHZ		2 MHz	
6502	4.90	6502A	5.90
6504	6.90	6520A	5.90
6505	8.90	6522A	9.90
6507	9.90	6532A	10.90
6520	4.30	6545A	12.90
6522	4.90	6551A	10.90
6532	9.90	**3 MHz**	
6545	8.90		
6551	8.90	6502B	7.90

6800

1 MHz		68B00 2 MHz	
6800	2.90	68B00	9.90
6802	7.90	68B02	11.90
6803	17.90	68B09	11.90
6808	12.90	68B09E	11.90
6809E	8.90	68B10	5.90
6809	8.90	68B21	5.90
6810	2.90	68B40	10.90
6820	4.30	68B45	18.90
6821	2.90	68B50	5.90
6828	13.90	**68000**	
6840	11.90	68000-8	34.90
6843	33.90	68047	23.90
6844	24.90	68488	18.90
6845	11.90	68652	14.90
6847	10.90	68661	8.90
6850	2.90	68764	17.95
6852	5.90	68766	19.95
6860	7.90		
6862	10.90		
6875	6.90		
6880	1.90		
6883	21.90		

8000

8031	14.90	8253	6.90
8035	5.90	8253-5	7.90
8039	5.90	8255	4.45
INS-8060	16.90	8255-5	4.90
INS-8073	29.90	8257	7.90
8080A	3.90	8257-5	8.90
8085	4.90	8259	5.90
8085A-2	11.90	8259-5	6.90
8086	24.90	8271	69.90
8087-3 (5 MHz)	159.90	8272	19.90
8087-2 (8MHz)	279.90	8274	28.90
8088	19.90	8275	28.90
8089	59.90	8279	6.90
		8279-5	7.90

8100

8131	2.90	8282	6.45
8155	6.90	8283	6.45
8155-2	7.90	8284	4.90
8156	6.90	8286	3.15
8185	28.90	8287	6.45
8185-2	38.90	8288	12.90
		8289	44.90
		8292	12.90

8200

8202	23.90
8203	38.90
8205	2.90
8212	1.75
8214	3.75
8216	1.75
8224	2.20
8226	1.75
8228	3.45
8237	12.90
8237-5	14.90
8238	4.45
8243	4.45
8250	9.90
8251	3.90
8251A	4.45

8300

8303	2.90
8304	1.90
8307	2.90
8308	2.90
8310	3.90
8311	3.90

8700

8741	28.90
8748	19.90
8749	28.90
8755	23.90

80000

80186-6	99.90
80188	69.90

Z-80

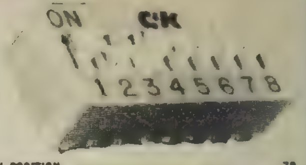
2 MHz			
Z80-CPU	1.95	Z80A-SIO/0	9.95
Z80-CTC	1.95	Z80A-SIO/1	9.95
Z80-DART	6.95	Z80A-SIO/2	9.95
Z80-DMA	7.95	Z80A-SIO/9	9.95
Z80-PIO	1.95	**6 MHz**	
Z80-SIO/0	8.95	Z80B-CPU	7.95
Z80-SIO/1	8.95	Z80B-CTC	8.95
Z80-SIO/2	8.95	Z80B-PIO	8.95
Z80-SIO/9	8.95	Z80B-DART	18.95
4 MHz		Z80B SIO/0	28.95
Z80A-CPU	2.45	Z80 SIO/2	28.95
Z80A-CTC	2.45	**ZILOG**	
Z80A-DART	7.95	Z6132	29.95
Z80A-DMA	8.95	Z8671	38.95
Z80A-PIO	2.45		

MEMORY EXPANSION KIT

4164 200ns

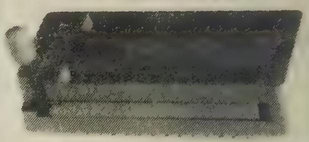
9 for $19.98

DIP SWITCHES



4 POSITION	.79
5 POSITION	.85
6 POSITION	.85
7 POSITION	.89
8 POSITION	.89

ZIF SOCKETS



14 pin ZIF	4.89
16 pin ZIF	4.89
24 pin ZIF	5.89
28 pin ZIF	6.89
40 pin ZIF	9.89

ZIF = TEXTOOL (Zero Insertion Force)

IC SOCKETS
(1 to 99)

8 pin ST.	.12	8 pin WW	.59
14 pin ST.	.14	14 pin WW	.69
16 pin ST.	.16	16 pin WW	.69
18 pin ST.	.18	18 pin WW	.99
20 pin ST.	.28	20 pin WW	1.04
22 pin ST.	.29	22 pin WW	1.34
24 pin ST.	.29	24 pin WW	1.44
28 pin ST.	.39	28 pin WW	1.64
40 pin ST.	.49	40 pin WW	1.94

ST = Soldertail WW = Wirewrap

CRYSTAL CLOCK OSCILLATORS

PART NO.	FREQUENCY	PRICE
1.000	1.0000 MHz	6.99
1.843	1.8432 MHz	6.99
2.000	2.0000 MHz	6.99
4.000	4.0000 MHz	6.99
8.000	8.0000 MHz	6.99
10.000	10.0000 MHz	6.99
16.000	16.0000 MHz	6.99
18.432	18.4320 MHz	6.99
19.660	19.6608 MHz	6.99
20.000	20.0000 MHz	6.99
32.000	32.0000 MHz	6.99

CRYSTALS

1.0000 MHz	2.69	8.0000 MHz	1.95
1.8432 MHz	2.69	10.0000 MHz	1.95
2.0000 MHz	1.95	10.7386 MHz	1.95
2.0972 MHz	1.95	12.0000 MHz	1.95
2.4576 MHz	1.95	14.3182 MHz	1.95
3.2768 MHz	1.95	15.0000 MHz	1.95
3.5795 MHz	1.95	16.0000 MHz	1.95
4.0000 MHz	1.95	17.4300 MHz	1.95
4.1943 MHz	1.95	18.0000 MHz	1.95
4.9160 MHz	1.95	18.4320 MHz	1.95
5.0000 MHz	1.95	19.6608 MHz	1.95
5.0688 MHz	1.95	20.0000 MHz	1.95
5.1850 MHz	1.95	22.1184 MHz	1.95
5.2429 MHz	1.95	32.0000 MHz	1.95
5.7143 MHz	1.95	36.0000 MHz	1.95
6.0000 MHz	1.95	48.0000 MHz	1.95
6.1440 MHz	1.95	49.4350 MHz	1.95
6.4000 MHz	1.95	49.8900 MHz	1.95
6.5536 MHz	1.95		

32.768 KHz ...... .99

VOLTAGE REGULATORS

7805T	.74	7905T	.84
78M05C	.34	7908T	.84
7808T	.74	7912T	.84
7812T	.74	7915T	.84
7815T	.74	7924T	.84
7824T	.74	7905K	1.44
7805K	1.34	7912K	1.44
7812K	1.34	7915K	1.44
7815K	1.34	7924K	1.44
7824K	1.34	79L05	.78
78L05	.68	79L12	.78
78L12	.68	79L15	.78
78L15	.68	LM323K	4.90
78H05K	9.90	UA78S40	1.90
78H12K	9.90		

C,T = TO-220 K = TO-3
L = TO-92

APPLE & IBM ACCESSORIES

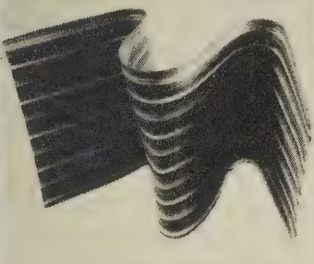
ROBOT KITS!

PIPER-MOUSE

Controlled by sound sensor and 1-channel electronic circuit. Use the whistle in this kit and Piper-Mouse follows your commands, turning left or right, stopping and starting. Uses 2 AA and 1 9V battery (not included).

MV-915 $44.95

RIBBON CABLE



CONTACTS	SINGLE COLOR		COLOR CODED	
	1'	10'	1'	10"
10	.45	4.30	.78	7.20
16	.50	4.70	.95	8.70
20	.60	5.60	1.15	10.00
25	.70	6.50	1.22	11.50
26	.70	6.50	1.27	11.50
34	.93	8.50	1.55	14.40
40	1.27	11.50	1.82	16.70
50	1.28	12.00	2.40	21.00

RESISTORS

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ALL STANDARD VALUES
FROM 1 OHM – 10 MEG OHM

50 PCS	1.25
100 PCS	2.00
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80-160 columns with any monitor!

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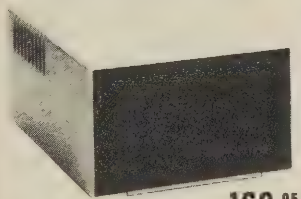
Parallel printer card, Apple II series

- Centronics compatible
- Variable print widths
- Up to 5000 characters/second

APPLE & IBM Compatible DISK DRIVES



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- Shugart mechanism, made in U.S.A
- Directly replaces Apple Disk II
- Fully compatible with Apple Controller or other Apple compatible controllers
- One Year Warranty

FULL or ½-Height

16K RAM Card – Apple II+

- 2-Year Warranty

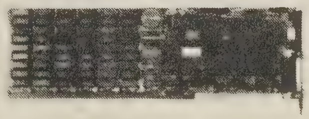
Assembled & Tested 39.95

APPLE or IBM JOYSTICK

$29.95

Compatible for either:
APPLE II and APPLE IIe
OR
IBM-PC, JR., & IBM-XT

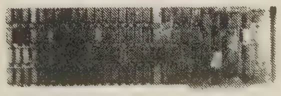
MULTIFUNCTION CARD



- 64K to 384K RAM
- Parallel Port
- Serial Port
- Clock Calendar
- Software Included
- 1-Year Warranty

$249.95

MEMORY CARD



- Expandable to 512K
- Fully compatible with IBM software
- Fully compatible w/IBM diagnostic utilities
- Serial Port Available
- 1-Year Warranty

$199.95

MEMORY EXPANSION KIT

4164 200ns
9 for $19.98

DISKETTES

5¼"

ATHANA: (SOFT SECTOR w/HUB RING)

25 per package

SS/DD	29.75 or 1.19 ea.
DS/DD	34.75 or 1.39 ea.

LIFETIME WARRANTY
ON ALL ATHANA DISKETTES

NO LABEL: (SOFT SECTOR w/HUB RING)

25 per package

SS/DD	24.75 or .99 ea.
DS/DD	29.75 or 1.19 ea.

2-YEAR WARRANTY
ON ALL BULK DISKETTES

ROBOT KITS!

PEPPY

2-way sensor detects noise or solid objects in its path. When front sensor contacts an obstacle or hears a loud noise (hand-clap), Peppy automatically turns to the left.
Uses 2 AA and 1 9V battery (not included).

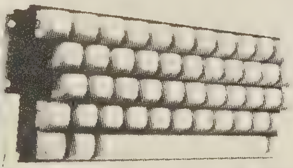
MV-916 $24.95

Reg. Power Supply

Model 4A/PS (99/4)
3 DC Outputs:
12V @ .4A, +5V @ 1.1A
−5V @ .2A Highly Filtered

6.95

KEYBOARD (99/4)



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CP/M

Jim Offenbecher

Control Program for Microcomputers

Part-II: Utilities

Utilities:

In my last article I discussed the inner workings of how a standard CP/M system functioned internally and powered up. This month I will discuss a few of the standard utility programs supplied with CP/M, what they are used for, and how to use them.

Standard vanilla CP/M comes with the below listed utility programs:

ASM.COM BIOS.ASM BOOT.ASM CBIOS.ASM
DDT.COM DUMP.ASM DUMP.COM ED.COM
LOAD.COM MOVCPM.COM PIP.COM STAT.COM
SYSGEN.COM SUBMIT.COM XSUB.COM

While they may not be the best utility programs available for CP/M, they do function, and you can run a system with them. Throughout this article, I will mention similar Public Domain programs that will perform the same functions, and in many cases be much more user-friendly and thorough in their operation.

ASM.COM

This is the CP/M standard Assembler. It will assemble Intel mnemonics (8080 only) from an assembly source file (.ASM) to an Intel format Hex file (.HEX). It does not support Macros, but it does support conditional assembly (IF and ENDIF) and the standard Pseudo-Ops. (ORG, END, DB, DW, DS) You can always tell a person's original CP/M disk because it will contain two unique files: ".HEX", and another called: ".PRN". These were produced when he just typed "ASM" without a filename, and without a special utility, or using wildcards, you can't erase a blank filename. The file with the .PRN extent is a print file that contains the original source code (.ASM) with the assembled code to the left of each line of source. It is normally 1.5 to 2 times as large as the original source file, and can sometimes cause a "DISK FULL" error.

The command structure for executing ASM is: A ASM filename.123

where:

- 1 — is the name of the drive where the source file is located (A-P).
- 2 — is the name where the .HEX file is to be placed. (A- P, and X for console, and Z for don't make one)
- 3 - is the name where the .PRN file is to be placed. (A-P, and X for console, and Z for don't make one)

So, the command ASM TEST.ABC would get the source file from A:, put the Hex file on B:, and put the .PRN file on C:, while the command ASM TEST.AZZ would just check the file for errors and not produce any additional files. A common mistake is to type ASM TEST.ASM, and you normally get an error like: Drive M not ready. If you enter just ASM TEST, the two output files will be put on the current drive.

There are only a few Public Domain assemblers available, ED/ASM from Sig/M Vol 68, and LASM from Sig/M Vol 170. Additionally, the program Z80MR is available from many Bulletin Boards.

BIOS.ASM, BOOT.ASM, CBIOS.ASM, CBOOT.ASM

These are samples of the Boot and Bios modules that can be used to make your own. If you're lucky, you may get your own system's customized Bios. Normally, OEM's don't include this, and this can be a problem if you need to modify something. The BIOS and BOOT are versions for the MDS-800 system (by Intel), and the CBIOS and CBOOT are skeletal versions that work with standard 8" diskettes (single density), where you have to furnish your own code to access your disk controller and I/O ports.

There are several custom versions of Bios available from the SIG/M volumes.

DDT.COM

DDT (Dynamic Debugging Tool), is a utility for assembly language programmers to trace operation of assembly language files while they are running. (Like TRON in Microsoft Basic). It includes commands to examine and alter individual CPU registers and Memory locations, and a very limited assembler and disassembler. It can be quite functional and works very well. The major limitation of it is that it does not support the additional Z80 instructions.

Another useful function of DDT is to customize programs utilizing an overlay (Like Modem740). You load the main object file in, then read in the customized options for your machine, then exit and save the customized version. Instructions for how to do this to Modem are included in each of the Modem 7 overlay files.

Public Domain versions are limited to a couple of enhancements to the existing DDT program, one of which is SDT from Sig/M Vol 196.

DUMP.ASM, DUMP.COM

This is a utility (with source file) to display a binary (object/.COM) file on the console in Hexadecimal notation. There are many, many programs in the Public Domain that will do this and much more.

ED.COM

I don't really know how to approach talking about this editor (and I use the term loosely). I have been running CP/M for about 7 years, and have never been able to figure out how to use it. I have found 3 or 4 individuals during the past years who claim to be able to use it, but I can't really verify that information. The documentation provided by Digital Research is a classic example on how not to write a manual, and the program itself is almost archaeic by modern-day microcomputer standards. My recommendations are to go out and buy an editor - ANY editor, rather than use ED.

LOAD.COM

The LOAD utility is the program to convert the .HEX file produced by the ASM program to a runtime COMmand file (.COM). It has no options and will produce a COM file that is 64k long if you attempt to load your BIOS.HEX file. Additionally, it will error if you attempt to load to an address below the bottom of the Transient Program Area (100Hex). A Sig/M utility for ZCPR- 3 called MLOAD.COM will do all that LOAD.COM will do and also load with an offset address.

MOVCPM.COM

This utility is useful only if you intend to modify your existing BIOS or to change the TPA size of your system memory. If you execute it with no options, it will check to see how much memory you have, create a system (CCP and BDOS) for that size, and move the modules to their correct address. This can cause many systems to bomb if they have a large BIOS as the new system image will conflict with the current one. The options for MOVCPM are:

MOVCPM xx *

where: xx is the system size you want, with an asterisk causing MOVCPM to check memory and use all that exists —

and: * (asterisk) is a flag to cause MOVCPM not to move the new system into its correct location, but to leave it configured in low memory for use by SYSGEN which puts it on the system tracks of the disk.

MOVCPM will produce one error message that is not defined in Digital Research Publications. That is "SYNCHRONIZATION ERROR". The error occurs when the serial numbers in the MOVCPM do not match the serial numbers of the system you are using.

Currently, I know of no Public Domain version of MOVCPM as it contains the actual copyrighted CP/M operating system components of CCP and BDOS.

PIP.COM

PIP (meaning Peripheral Interchange Program) is the standard CP/M file copy program. It will copy files from either disks or logical devices (console) to files or logical devices (console, printer). It has many options including verification, disregard end-of-file characters imbedded, check for valid Intel Hex format, pagination, expanding tab stops, line numbering, start and stop strings, get file from other user areas, remove form feeds, zero the hi-bit produced by Wordstar Document files, change all chars to lower or upper case, echo to console, and truncate lines.

In addition to the standard file copy commands that everyone is familiar with, PIP can be used to skip over form feeds and expand tab stops - for example:

PIP LST: = FILENAME.EXT[t8p60]

would expand tab stops to every eighth column and insert form feeds every 60 lines.

Another very useful function of PIP is to change printer settings before you print an ASCII file with it - for example if your printer required an escape 'E' to put it into 12 pitch mode, the command:

PIP LST: = CON:,FILENAME

would pause before printing the file. You could then hit the escape key, then the 'E' key, then the control-Z key to end the input. PIP would send the first two characters to the printer setting it up for 12 pitch, and then send the file to the printer after the control-z was struck.

PIP can also be used to concatenate files by separating the names with commas.

The most popular Public Domain replacement for PIP is NEWSWEEP, currently at revision level 2.07. It allows a much more user friendly transfer of files, more reliable verification, and easier transfer between user numbers, however it doesn't support the console as a logical input device.

STAT.COM

STAT is normally used to show you how big a file is and how much space is remaining on the disk. It is also used to flag files as Read-Only and System(won't show up in a DIR listing). Three of the little-used options of STAT are: the 'USR:' option that will show you which user you are in and which user areas contain files, the 'DSK:' option which will show you the Disk Parameter Block for the drive specified, and the 'VAL:' option which will show you all the options available with STAT (Almost like a help command).

SD.COM is probably the most often used Public Domain program to show you how big the files are and how much free space remains on the disk, while NEWSWEEP will allow you to set and clear the Read-Only and System attributes.

SYSGEN.COM

SYSGEN is the utility that allows you to copy the system tracks of floppy disks to make them bootable. An unpublished option is that if you follow the command with the name of a file - e.g. 'SYSGEN CPM56.COM', SYSGEN will load the specified file,

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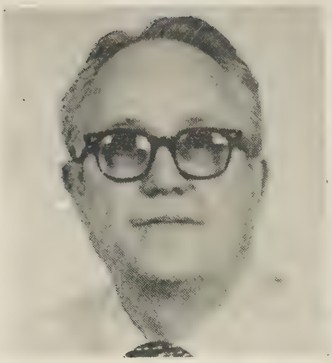
KAYPRO II

P. C. Cothran



Among my activities is helping my friends, if they ask for it. I learned, with three children, plus two grandchildren, that help extended prior to a request for help is frequently resented, and advice proffered gratis is usually disregarded, no matter how good or worthy.

Had a friend, erecting a building, ask for a BASIC program to (1) work out payments on a contemplated loan and (2) once the digits appealed to him, print out an amortization schedule.

His request was worded something like this: "PC, I have a lot of software that will work up an amortization table, some of it from you. I need something I can insert key digits into, come up with a statement on what I fed in, then what any given loan will cost me in terms of real money. Can you do it?"

This was over a month ago, you know some of the problems I encountered with my Tandon drives, so this was put on the back burner until other items were straightened out, or at least not "bad".

In doing the program for my friend, I worked through several problems, recorded here so as to prevent YOU from having to work them out.

1) In an amortization schedule, it is "easy" to start a routine with the payment sequence using number to represent payment.

2) Using abbreviated months (JAN,FEB,..DEC) it is necessary to allow for the initial month, when the loan was signed, as month "0" in number — and back up one month from the month of first payment.

   a. It "aint easy" when the month of first payment is JAN, because the assumption must be made that the zero month is DEC of the previous year. Try to back up in DATA or some of the other ways of recording strings!
   b. Due allowance had to be made on headers. I choose to use this sequence:"REPAY SCHEDULE FOR", and follow it with the year. Since I had two questions (prompts) in the program that asked 'Do you want to see the digits from the Rule of 7/8ths" and "Do you want a hard copy of this schedule", this promoted a selection of alternate headings to print at the start of each year of the loan schedule. This caused me to look at MicroSoft BASIC to see if I could use logical operators to determine which of the alternate headings to bring to (a) the screen and (b) the printer.

3) I found that MicroSoft BASIC did indeed have logical operators, but that the logical operators in this form of BASIC were not logical.

4) Boolean Algebra is well known, and precise. Two states are permitted. They are TRUE and NOT TRUE, usually abbreviated as "1"and "0", or whatever. The truth table program at the end of this article shows what I found in MicroSoft, and satisfies the logic of two-state arithmetic/algebra. When you examine the program, you will find no aberrations in AND, OR, and Exclusive OR (XOR), but the NOT-ting and EQV and IMP sections had to be badly distorted from MicroSoft to accomplish the Truth Table printed when you RUN the program.

Conclusion # 1: MicroSoft should have a copy of this article; I have to be doing something wrong, or George Boole never wrote his skinny little treatise.

Conclusion # 2: When you read a handbook or follow direction in even the BEST of documentation, don't put your brain in neutral. If the results don't come out to what you KNOW it should be, first, see what errors YOU have made. Second, see what errors could have introduced by different assumptions by them and you.

If conclusion # 2, above, is a bit turgid, forgive me. I am still trying to read 20-30 disks with data on them I can't afford to wipe, and have not yet worked out a way to read them. Have thought through the problem of skewing my read/write heads on one drive until I can read these disks, then PIP-ing them to the reference drive. After they are all transferred, make the skewed drive align with the reference drive, and I could be "home free". I could also incur another two hundred dollar bill in Micro Solutions in Birmingham, plus over two hundred miles round trip.

So you can see that I am, as usual, "having fun" with my Kaypro II.

Note: In the listing below, I had to break lines 10, 30 and 40 to fit them into the space allocated for a 55-column wide magazine. Put them on one line, if you can, and they will "run".

```
10 REM SHOWING LOGICAL OPERATORS. MAKE ENTRY
IN ARTICLE FOR CTM.
20 FOR X=1 TO 24:PRINT:NEXT
30 PRINT"Logical Operators taken from Micro-
Soft Basic, General Information,";
40 PRINT"1.8.3.  Not responsible for Table,
just for showing it to you."
50 PRINT
```

```
60 PRINT"Use CRTL C to stop, then CONT to
resume."
70 PRINT
80 PRINT"AND "
90 LET A=0:B=0
100 PRINT
110 PRINT," A"," B","A AND B"
120 PRINT,A,B.A AND B
130 LET A=0:B=1
140 PRINT,A,B.A AND B
150 LET A=1:B=0
160 PRINT,A,B,A AND B
170 LET A=1:B=1
180 PRINT.A,B,A AND B
190 FOR X=1 TO 2000:NEXT
200 PRINT
210 PRINT"OR"
220 PRINT
230 LET A=0:B=0
240 PRINT," A"," B"."A OR B"
250 PRINT,A,B,A OR B
260 LET A=0:B=1
270 PRINT,A,B,A OR B
280 LET A=1:B=0
290 PRINT,A,B,A OR B
300 LET A=1:B=1
310 PRINT.A.B,A OR B
320 PRINT
330 FOR X=1 TO 2000:NEXT
340 PRINT
350 PRINT"XOR (Exclusive OR)"
360 PRINT
370 LET A=0:B=0
380 PRINT," A"," B","A XOR B"
390 PRINT,A,B,A XOR B
400 LET A=0:B=1
410 PRINT,A,B,A XOR B
420 LET A=1:B=0
430 PRINT,A,B,A XOR B
440 LET A=1:B=1
450 PRINT,A,B,A XOR B
460 FOR X=1 TO 2000:NEXT
470 PRINT
480 PRINT"EQV (sometimes called exclusive
NOR)"
490 LET A=0:B=0
500 PRINT
510 PRINT," A"," B","A EQV B"
520 IF A=0 AND B=0 THEN C=1
530  PRINT,A,B,C
540 LET A=0:B=1
550 IF A=0 AND B=1 THEN C=A AND B
560  PRINT,A,B,C
570 LET A=1:B=0
580 IF A=1 AND B=0 THEN C=0
590  PRINT,A.B,C
600 LET A=1:B=1
610 IF A=1 AND B=1 THEN C=A AND B
620  PRINT,A,B,C
630 FOR X=1 TO 2000:NEXT
640 PRINT
650 PRINT"IMP - X implies Y"
660 PRINT
670  PRINT," A"," B","A IMP B"
680 LET A=0:B=1:IF A=0 AND B=1 THEN C=A XOR B
690  PRINT,A,B,C
700 LET A=0:B=1:IF A=0 AND B=1 THEN C=A XOR B
710  PRINT,A,B.C
720 LET A=1:B=0:IF A=1 AND B=0 THEN C=A AND B
730  PRINT,A,B.C
740 LET A=1:B=1:IF A=1 AND B=1 THEN C=A AND B
750  PRINT,A,B.C
760 PRINT
770 FOR X=1 TO 200:NEXT
780 PRINT
790 PRINT"NOT - inverse function"
800 PRINT
810 LET A=0
820 IF A=0 THEN B=1
830  PRINT," A"," A NOT"
840  PRINT,A,B
850 LET A=1:IF A=1 THEN B=0
860  PRINT,A,B
870 FOR X=1 TO 200:NEXT
880 PRINT
890 PRINT"Microsoft logic:"
900 PRINT
910 LET A=0
920 PRINT," A"," NOT A"
930 PRINT .A,NOT A
940 LET A=1
950 PRINT .A, NOT A
```

Have to show you the selection of headers and testing routine (line 2070) from that bells-and-whistles loan program, below:

```
1710 REM HEADER, SCREEN,RULE
1720PRINT
1730 PRINT"MONTH","PAYOFF","THIS PMT"."RULE
OF 7/8'S","PAYMENT
1740 PRINT,"BALANCE","INTEREST","RIPOFF".
"NUMBER"
1750 PRINT
1760RETURN
1770REM HEADER,SCREEN.NO RULE
1780PRINT
1790 PRINT"MONTH","PAYOFF"."THIS PMT."..""PAY-
MENT"
1800PRINT,"BALANCE","INTEREST",."NUMBER"
1810PRINT
1820RETURN
1830REM HEADER. LPRINT,RULE
1840LPRINT
1850 LPRINT"MONTH","PAYOFF"."THIS PMT","RULE
OF 7/8'S","PAYMENT"
1860LPRINT,"BALANCE","INTEREST","RIPOFF",
"NUMBER"
1870LPRINT
```

```
1880RETURN
1890REM HEADER. LPRINT. NO RULE
1900LPRINT
1910 LPRINT"MONTH","PAYOFF"."THIS PMT".."PAY-
MENT"
1920LPRINT,"BALANCE","INTEREST",."NUMBER"
1930LPRINT
1940RETURN
1950REM WANTS HARD COPY, CHECK PRINTER.
1960 PRINT
1970 FOR X=1 TO 80:PRINT"*";:NEXT
1980PRINT"Turn ON your printer. put it ON
LINE."
1990 PRINT
2000 PRINT"Enter CONT and <CR> when your
printer is ON and ON LINE."
2010 PRINT
2020 PRINT
2030 FOR X=1 TO 80:PRINT"*";:NEXT
2040 PRINT
2050 STOP
2060 RETURN
2070 REM TESTING CHOICES - LINE 1180
2080 PRINT"K=";K,"H=";H,"R=";R
2090 LET K=1:H=0:R=0:GOSUB 1100
2100 PRINT"Should be to screen, no rule."
2110 REM
2120 LET H=0:R=1:GOSUB 1100
2130 PRINT"Should be to screen, rule."
2140 REM
2150 H=1:R=0:GOSUB 1100
2160 PRINT"should be hard copy. no rule"
2170 REM
2180 H=1:R=1:GOSUB 1100
2190 PRINT"Should be hard copy. rule"
2200 STOP
```

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FROM OFFENBECHER Pg. 55

and skip the 'Source disk' request. Beware though, because it will not tell you if the file loaded is too short to contain the entire system.

Because most hardware configurations use different densities and weird system track configurations, There are no Public Domain versions available except for a few specific systems. There is however, a modification available on Sig/M Vol 68 called TURNKEY that allows you to force your system to run a program on either cold boot, warm boot or both. (my first published program!)

SUBMIT.COM and XSUB.COM

These two programs are used if you require batch processing. You can create an ASCII file of commands to perform from the CP/M prompt (or from within a program with XSUB option) and execute them with the single command of: SUBMIT filename.

Disadvantages of them are that they create a file on the disk and that certain programs use different character input routines that they will not recognize.

The Public Domain program EX.COM will replace both SUBMIT and XSUB with many additional options including an internal editor to directly input the commands, no disk file is produced, and the program can be recursive. Additionally, for ZCPR-3 users, the ZEX program adds conditional execution with branching and looping on internal register counts, File presence, input, and several others.

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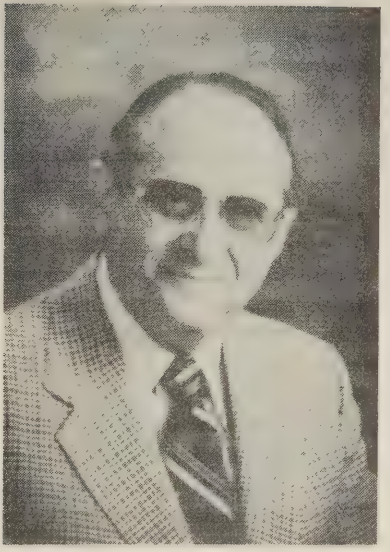
"ADAM Series — Introduction"

Fred Blechman, K6UGT



Introduction

The Coleco ADAM (tm) Family Computer system was the first low — quality printer, built — in word processing, SmartBASIC (tm), and elaborate keyboard with special function keys, and tape storage, Coleco saved a first buyer from selecting among the bewildering array of component choices available.

Although some compromises were made to keep the total cost down, the ADAM is a fairly sophisticated system, and many of its capabilities are not covered in the documentation that comes with it. Word processing is covered adequately by the SmartWRITER (tm) Manual and Easy Reference Guide, but the SmartBASIC Programming Manual provided with ADAM is really just a guide to explaining some of the BASIC language used on the ADAM, without many programming examples. Its prime purpose is to cover all the commands and statements with a rather broad brush, to explain what the do — but it is not intended to teach programming. It can't go into great detail on most things, since it has to concentrate on information rather than application.

On the other hand, the thrust of this series of articles is into applications of SmartBASIC. If you want to know more about SmartBASIC, with detailed explanations of the commands and how they're used, these article will help you.

If the ADAM is your first computer then these articles will carry you beyond the brief explanations in the ADAM manual. However, no matter what the fast — talking computer salesperson told you, and no matter how simple the computer ad copy writers say it is, learning to program — even in SmartBASIC — will take time, concentration, practice and perseverence.

If you've had BASIC programming experience on other computers, these articles should still help you! Why? Because ADAM SmartBASIC is probably quite different in many respects from your past experience. The ADAM uses a version of BASIC very similar to that used on the Apple (tm) computer — and Applesoft BASIC has a number of differences compared to some other BASICs. Also, ADAM graphics are unique in some respects to this computer only.

I'm going to assume you have an ADAM Computer, that you have the SmartBASIC Manual, and that you are somewhat overwhelmed or want more information in some areas. Refer to the Manual often, since I don't intend for these articles to duplicate the Manual, but rather to summarize or expand its coverage. I'll simplify some sections, and will illustrate others with actual programs as examples. You will learn by doing, by actually keyboarding in each program, reading the program line — by — line explanations, and then making suggested changes. One of the most powerful ways of learning is by example. However, to paraphase a familiar expression, "I can lead you to the keyboard, but I can't make you program." You are the key.

Note: Since the ADAM printer is unable to reproduce inverse printing or graphics from the screen, I've used a new product called a Video Printer (Mitsubishi Model P50U) for screen prints throughout these articles. The $390. unit thermal printer connects directly to the MONITOR output of the ADAM and prints the screen image in black and white (and 14 shades of gray). Reproduction of some of these video prints may suffer from handling, but theyf are representative.

Fred Blechman
c/o **CTM** **CTM**

The manuscript for this Adam Computer book, from which this first article was taken, can be obtained from the author for only $500. plus nominal royalties. Please contact author through **CTM**.

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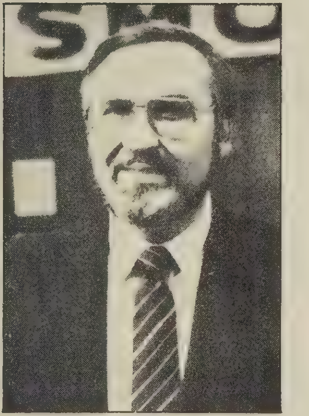

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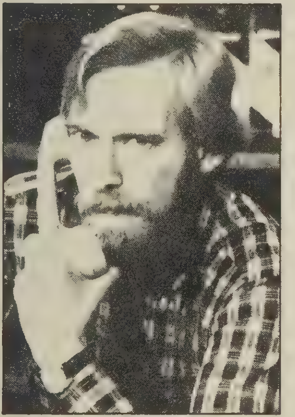

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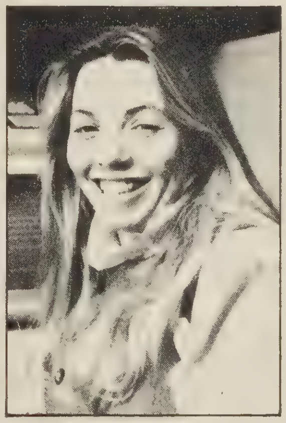

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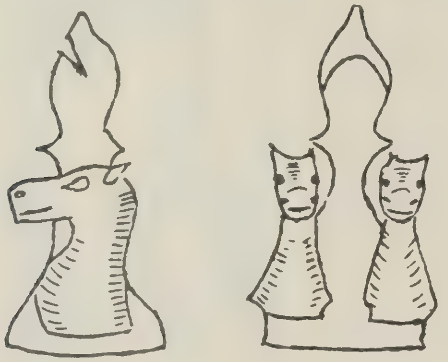
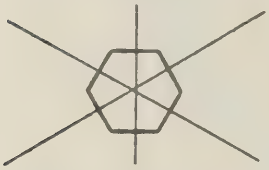
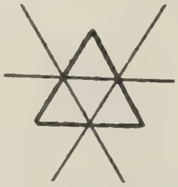


The Double Rook (D) (Rook on Rook) moves in straight lines through rectangles and hexagons (same as Rook) and also moves in straight lines through triangles and rectangles between the Rook's straight line paths. The Double Rook moves on a double set of straight lines.



Paths of a Double Rook (D)
From a Hexagon



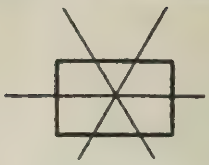
(D) From a Triangle

The word Trishop (T) is derived from the combination of Tri and Bishop. Tri is for the Trishop's composite of three chessmen.

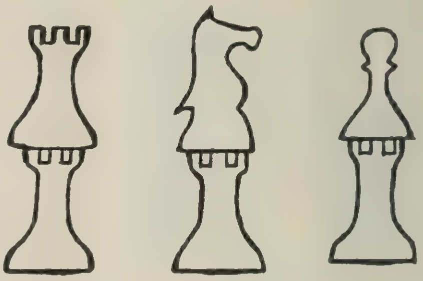
The Trishop moves like a Knight or a Bishop.

the design is such that they will not fall over when placed on the board, also they are constructed using standard chessmen to keep the look of the complete set. The Castle (Rook) is used for the foundation in building three of the chessmen and the bishop is the foundation for the fourth. This made it easy to manufacture new chessmen using a second set of the same design. The flying warrior ace accounts for the name "Ace".

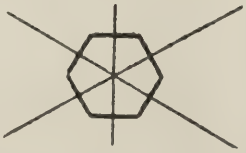
Al Stanonis



(D) From a Rectangle



Ace (A) (Pawn on Rook) moves like the Double Rook or Bishop.
High Knight (H) (Knight on Rook) moves like a Rook or Knight.



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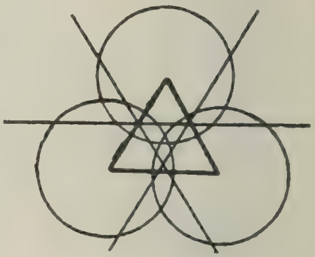
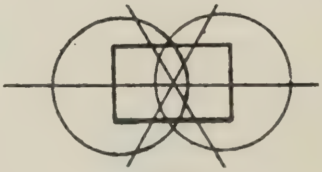
From a Hexagon



(A) From a Triangle



(A) From a Rectangle

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CTM

Food for your TS-2068

A Private-Key Cryptosystem

Imre Auersbacher

The subject this month will be cryptography. Cryptography, as you all know, is the science of disguising information into unintelligible code that would be worthless to any would-be trespasser. The 2068 computer, because of its speed and ability to manipulate large character arrays, makes an excellent secret-coding machine. The program I will present below is a sophisticated "private-key" cryptographic system which is very easy to use, provides a high level of cryptographic protection, and is quite fast. The program allows you to encipher your confidential or sensitive messages by means of a personal password (which must be kept secret). Only by using the exact password can you, or anyone else, decipher or unlock coded messages into their original form.

Without going into technical details, the program works in the following manner. The password (which you define) operates mathematically on the plaintext (original message) and transforms it into ciphertext, i.e. the encrypted message. The algorithm used by the program to encrypt/decrypt messages is highly resistant to crypt-analysis, as the resulting messages cannot be analyzed for letter occurrence frequencies, patterns, etc. It is also important to note that even if someone has a TS-2068 computer and a copy of this program, he (or she) would find it practically impossible to decipher your coded messages, unless the proper password is known.

The strength of this encryption security resides in the password itself which is used to "scramble" the plaintext message. Because there are so many possible character permutations in a password (which may be of any length), and because only the exact combination will properly decipher a given message, any attempt to "break" coded messages without the password cana be infinitely difficult. For example, there are about 228,000,000,000,000,000 (228 quadrillion) possible passwords or keys of length 10 which may be constructed from a set of 59characters. Even for a main-frame computer attempting to "break" the code by trying one million passwords per second, it would take on the average about 3600 years to find the right one!

The program is quite user-friendly, as it features menu and option screens which help guide you through the encryption/decryption process. There are also options for saving coded messages to tape, copying messages to the printer, and for superenciphering text to any level (more on this later). Somewhere below is a sample run of the program showing a short message before and after encryption. The password used here was **"** COMPUTER TRADER MAGAZINE **"**. Note that all letters, characters, and spaces are significant. In this case the password is 30 characters in length, providing a high level of security.

Messages may be of almost any length, although in this program I have dimensioned the message array (m$) to 2500 characters. This will allow you to enter the contents of a good-sized letter. However, you may increase the argument of the DIM statement in line 2 of the program up to 30,000. This would allow you to encode the contents of a small booklet at one time. I have chosen an argument of 2500 characters, as most messages are fairly short and short text files may be saved and loaded from tape much faster.

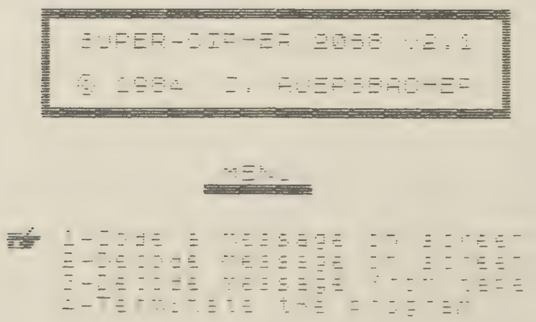
When entering messages, just use the keyboard as you would an ordinary typewriter. You may use letters (A-Z), numbers (0-9), the space bar, and characters like $*&@!.;:, etc., but graphics are not allowed. The message will appear on the screen as you type and will also be stored simultaneously in RAM. The program is fast and should be able to keep up with you touch-typists. You should type carefully however, as the text cannot be corrected once it appears on the screen. Important: press the ENTER key when you are finished typing in the message. The program will then begin to encode your text at a rate of approximately 15 characters per second.

Messages may also be superenciphered to any level, i.e. enciphering an already encrypted message, which provides extremely high level security. For this, you should use a different password for each level of encryption. Of course, to decipher a supernenciphered message, you must enter the passwords in reverse order. Superenciphering is not usually required, unless you are using short, simple passwords like "cat", "ABCXYZ", etc. For passwords or keys of length 10 or more, a single encryption operation provides adequate security, and superenciphering is not necessary. Just be sure to memorize your password and keep it secret.

After typing in this program, be sure to save a few self-starting copies on tape by typing RUN 9990.

Subsequent copies will then auto-RUN upon loading. It may take some of you about an hour or so to key in this program. If you would rather not, just send me a blank cassette tape and $3.00 (for postage & handling), and I will provide you with a copy by first-class mail.

```
   1 GO TO 2500
   2 LET l=1: DIM m$(2500)
   3 POKE 23692,2
   4 IF INKEY$<>"" THEN GO TO 4
   5 IF INKEY$="" THEN GO TO 5
   7 LET q$=INKEY$: IF CODE q$=1
3 THEN LET m$(l)=q$: RETURN
   8 IF CODE q$=0 THEN GO TO 4
   9 LET m$(l)=q$: LET l=l+1: PR
INT q$;: GO TO 4
  20 CLS : PRINT PAPER 6;"Coded
message --": PRINT 
  22 LET y=1: POKE 23692,0
  25 FOR z=1 TO LEN m$
  30 IF y>LEN y$ THEN LET y=1
  35 LET t=CODE m$(z): IF t=13 T
HEN LET l=z-1: RETURN
  40 LET x=z(y)+t+2
  45 LET q$=CHR$ (x-59*INT (x/59
)+32): LET m$(z)=q$: PRINT q$;
  50 LET y=y+1: NEXT z: RETURN
  60 CLS : PRINT PAPER 6;"Decode
d message --": PRINT 
  62 LET y=1: POKE 23692,0
  65 FOR z=1 TO LEN m$
  70 IF y>LEN y$ THEN LET y=1
  75 LET t=CODE m$(z): IF t=13 T
HEN LET l=z-1: RETURN
  80 LET x=t-z(y)-42
  85 IF x>=31 THEN GO TO 95
  90 LET x=x+59: GO TO 85
  95 LET q$=CHR$ (x+1): LET m$(z
)=q$: PRINT q$;: LET y=y+1
 100 NEXT z: RETURN
 110 PRINT : PRINT "Password? ";
 120 INPUT y$: IF LEN y$<=1 THEN
 BEEP 0.5,-20: GO TO 120
 125 PRINT FLASH 1;"Secret"
 130 LET t=LEN y$: DIM z(t)
 140 FOR z=1 TO t: LET x=CODE y$
(z)+CODE y$(z)+CODE y$(t)-t-32
 150 LET z(z)=x-59*INT (x/59)
 160 NEXT z: PRINT : RETURN
 200 BORDER 5: POKE 23658,8: PAP
ER 3: CLS : POKE 23609,10
 210 PRINT PAPER 5;AT 2,3;"▗▄▄▄▄▄
▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▄▖";AT 3,3;"▐
 SUPER-CIPHER 2068 V2.1 ▌";AT 4,
3;"▐                          ▌";A
T 5,3;"▐ © 1984  I. AUERSBACHER
▌";AT 6,3;"▝▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀
▀▀▀▀▘"
```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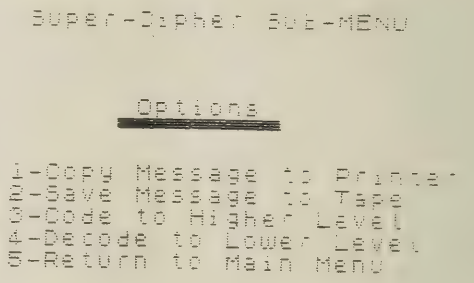
MENU

☞ 1-Code a message on screen
2-Decode message on screen
3-Decode message from tape
4-Terminate the program

```
 220 PRINT PAPER 7;AT 9,12;" MEN
U ": PAPER 3;AT 10,12;"▀▀▀▀▀▀";
PAPER 7;AT 12,4;"1-Code a messag
e on screen";AT 13,4;"2-Decode m
essage on screen";AT 14,4;"3-Dec
ode message from tape";AT 15,4;"
4-Terminate the program   "; PAP
ER 5;AT 21,3;"Please Choose Opti
on (1-4)"
 230 LET q$=INKEY$: IF q$="" THE
N GO TO 230
 240 LET l=CODE q$-48: IF (l<1)+
(l>4) THEN BEEP 0.5,-15: BEEP 0.
5,-20: GO TO 230
 245 BEEP 0.05,25
 250 PRINT INK 0;AT 11+l,1;CHR$ 
144; INK 6;CHR$ 145: PAUSE 60
 260 BEEP 0.04,20: BEEP 0.04,20
 270 PAPER 7: GO TO 1000+l
1000 CLS : PRINT PAPER 6;"    1.
Code Message on Screen"
1010 GO SUB 110: PRINT PAPER 5;"
Enter Message-->": GO SUB 2
1020 GO SUB 20: PRINT
1030 PRINT : PRINT FLASH 1;" Cod
ing Complete ": PRINT : PRINT 
1040 PRINT PAPER 6;AT 21,3;"Pres
s any key to continue"
1050 IF INKEY$="" THEN GO TO 105
0
1055 BEEP 0.1,25: PAPER 3: CLS :
 PRINT PAPER 1; INK 7;AT 2,4;" S
uper-Cipher Sub-MENU "
1060 PRINT PAPER 7;AT 6,10;" Opt
ions ": PAPER 3;AT 7,10;"▀▀▀▀▀▀▀
▀▀": PAPER 7;AT 9,4;"1-Copy Mess
age to Printer";AT 10,4;"2-Save 
Message to Tape   ";AT 11,4;"3-C
ode to Higher Level  ";AT 12,4;
"4-Decode to Lower Level  ";AT 1
3,4;"5-Return to Main Menu   ";
 PAPER 5;AT 21,3;"Please Enter O
ption (1-5)"
```


Super-Cipher Sub-MENU

Options

1-Copy Message to Printer
2-Save Message to Tape
3-Code to Higher Level
4-Decode to Lower Level
5-Return to Main Menu

```
1065 LET q$=INKEY$: IF q$="" THE
N GO TO 1065
1070 LET x=CODE q$-48: IF (x<1)+
(x>5) THEN BEEP 0.5,-15: BEEP 0.
5,-20: GO TO 1065
1075 BEEP 0.05,25: PRINT INK 0;A
T 8+x,1;CHR$ 144; INK 6;CHR$ 145
1080 PAUSE 60: PAPER 7: BEEP 0.0
5,25: IF x=5 THEN GO TO 200
1085 GO SUB 1000+100*INT x
1090 GO TO 1055
1100 LPRINT : LPRINT m$( TO l): 
LPRINT : LPRINT : RETURN
1200 CLS : PRINT PAPER 5;AT 2,2;
"Name of this message file"
1205 POKE 23658,0
1210 INPUT a$: IF LEN a$>10 OR a
$="" THEN BEEP 1,-20: GO TO 1210
1215 PRINT '''a$: POKE 23658,8
1220 SAVE a$ DATA m$()
1230 BEEP 0.1,25: PRINT AT 5,2;
"File ";a$;" Saved.": FLASH 1;AT
 8,2;" Stop Recorder "
```

```
1240 PAUSE 500: RETURN
1300 CLS : GO SUB 110: GO SUB 20
1310 PRINT : PRINT : PRINT FLASH
 1;" Coding Complete ": PRINT :
PRINT : PAUSE 2000: RETURN
1400 CLS : GO SUB 110: GO SUB 60
1410 PRINT : PRINT : PRINT FLASH
 1;" Decoding Complete ": PRINT
: PRINT : PAUSE 2000: RETURN
2000 CLS : PRINT PAPER 6;"  2. D
ecode Message on Screen    "
2010 GO SUB 110: PRINT PAPER 6;"
Enter Message-->": GO SUB 2
2020 GO SUB 60: PRINT
2030 PRINT : PRINT FLASH 1;" Dec
oding Complete ": PRINT : PRINT
2040 GO TO 1040
3000 CLS : PRINT PAPER 6;"  3. D
ecode Message from Tape    "
3010 GO SUB 110: PRINT "What is
file name? ";: POKE 23658,0
3020 INPUT x$: IF LEN x$>10 OR x
$="" THEN BEEP 1,-20: GO TO 3020
3030 PRINT x$: POKE 23658,8
3035 INPUT "Press ENTER & Start
Recorder "; LINE q$
3040 PRINT : PRINT FLASH 1;AT 6,
2;" Loading ";x$;" "
3045 LOAD x$ DATA m$()
3050 BEEP 0.1,22: PRINT : PRINT
FLASH 1;" Please Stop Recorder "
3060 PAUSE 300: CLS : PRINT m$(
TO 672): PAUSE 120: GO TO 2020
4000 CLEAR : SOUND 7,62;8,15
4020 FOR i=40 TO 120: SOUND 0,i
4025 LET x=i-6*INT (i/6)+1
4028 PAPER x: BORDER 7-x: CLS
4030 PAUSE 1: NEXT i
4040 SOUND 6,6;7,7;8,16;9,16;10,
16;12,56;13,8
4045 BORDER 0: PAPER 0: CLS
4050 PAUSE 30: BORDER 7: PAPER 7
: CLS : PAUSE 30: BORDER 0
4055 PAPER 0: CLS : PAUSE 30
4058 BORDER 7: PAPER 7: CLS
4060 SOUND 8,0;9,0;10,0
4070 PRINT FLASH 1;AT 10,5;" Pro
gram Terminated "
4080 PRINT PAPER 6;AT 14,6;" Sec
urity Risk = 0 ": DELETE 0,4000
4090 PAUSE 300: NEW
9500 BEEP 0.05,22: BEEP 0.06,20:
 POKE 23609,10: POKE 23658,8
9800 RESTORE 9900: FOR i=0 TO 7:
 READ x,y: POKE USR "a"+i,x: POK
E USR "b"+i,y: NEXT i: GO TO 200
9900 DATA 0,24,0,48,127,96,127,2
55,127,255,115,248,115,248,127,2
40
9990 SAVE "cipher" LINE 9500
```

```
    1. Code Message on Screen

Password? SECRET

Enter Message-->
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Coded message -->

7C7"30$6>(3+'&",!"1X*ZY.38#0:9FG
+$2%'0('<91<X"'5E$Z#PDV,!:IH9F=3
&X,75P%32H+VP3.3L(PD98'9:HK5'RE7
/62V3+047.R07,%*P;3)P8;I5;/%9X-(
&#/=73%0(*9*71 5-0/7I7<07!0!:@7@

 Coding Complete
```

The program has many uses. It may be used for private, secure communications between users, with the sender and receiver both using the same password. Messages may be sent on paper tape or magnetic cassette tape (preferred). Or simply operate the program for your own personal use to encipher your confidential information and data in secret files. Women may use the program to create a "snoop-proof" diary. Of course, you may think of other applications of this program, but remember you don't have to be a spy or secret agent to use it.

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A Serial Interface Project for the ZX-81 & TS/1000

(Part Two)

Vic Rice

Introduction

This is the second article of a series dealing with a serial interface with which to connect your ZX81/TS1000 to a printer, modem or other device. Part one dealt with the actual wiring of the circuit; this one will cover the programming required to obtain useful work from the device. (For those who missed Part 1, the wiring diagram for the interface board is shown as Figure 1).

The 8251 USART

The real heart of the circuit is the 8251; the rest of the chips on the board exist only in a supporting role. The 8251 is a prime example of a labour saving "black box". You pass it data, and it will look after serializing each byte of data, adding "start" and "stop" bits, generating parity, and then sending the resultant bit stream at some given rate of speed. For incoming data it will strip off "start" and "stop" bits, do parity checking for you, and assemble and pass over the full bytes of data as you request them. In order to do its job, however, it will require some instructions from you the programmer.

As you should have noticed in the wiring diagram, there are two "ports" shown on the 8251. These are specifically the "CONTROL" port and the "DATA" port. The names are indicative of their functions: the control port is used to control the functions of the 8251, and the data port is used to pass data back and forth between the computer and the outside world. Once the 8251 has been "initialized" (told what you want it to do), then sending or receiving data is a straight forward movement of data a byte at a time into and out of the data port. Software-wise, the interesting part is thus the control port.

Initializing the 8251

When you first apply power to your Sinclair, control passes to the "cold start" routines of the ROM. This is a set of pre-coded routines which clear and verify storage, set up the display file and generally get the computer ready for work. In the same manner as the ROM routines get the computer ready for work, so you have to supply a set of routines to get the 8251 ready. Of course the 8251 is much simpler than the CPU so the set-up code will also be simpler. The 8251 only responds to two instructions: the "MODE" and the "COMMAND". Both of these are one byte values which you can pass into the control port (with an assembler "LD" or BASIC "POKE"). Each of these bytes consist of 8 bits, all of which have their meanings to the 8251, resulting in the awe-inspiring tables in Figures 2 and 3. Although the tables look a bit daunting at first, the actual programming is quite easy.

Generally speaking, the "COMMAND" instruction tells the 8251 what to do (i.e. send or receive data), while the "MODE" instruction says how to do it (i.e. BAUD rate, character size). The actual initialization of the 8251 is accomplished in three steps.

1) Reset the USART.
2) Set the operating mode.
3) Define the operation to be performed.

Resetting the 8251

This is the simplest of the "COMMAND" instructions. Referring to Figure 3, you will see that the hex "40" bit is labelled "IR" (Internal Reset). Any value which includes this hex "40" bit ON, when "POKE"d into the control port will reset the 8251. Once the 8251 has received the reset command it will stop whatever it is doing and wait for a "MODE" followed by another "COMMAND" instruction in that order.

The "MODE" Setting

The next step is to specify the operating mode of the 8251. To do this correctly you have to know the format in which you will be exchanging data with the other device (computer, printer or whatever).
You will need to know:

1) The character size.

This is the number of bits forming one byte of transmitted data, which can vary from a minimum of 5 to a maximum of 8 bits. From Figure 2, the labels "L2" and "L1" (hex "04" and "02") in combination are used to specify the character length. 7 bits / char would be "L2" = 1 and "L1" = 0, for a value of 4 + 0 = 4. 8 bits / char would be "L2" = 1, "L1" = 1, for a value of 4 + 2 = 6. 2) The Parity.

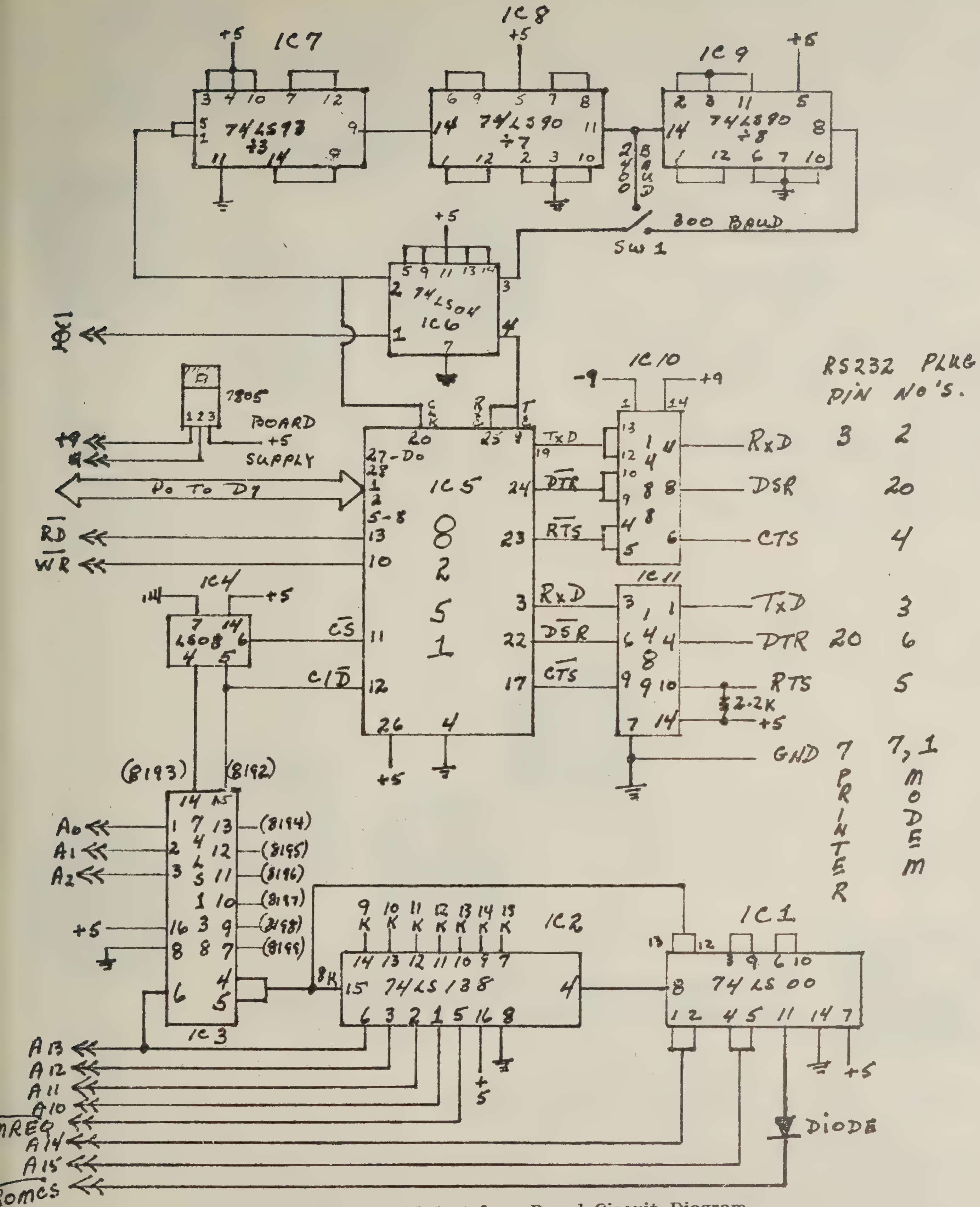

Figure 1: The RS232 Interface Board Circuit Diagram

CONT RICE Pg. 69

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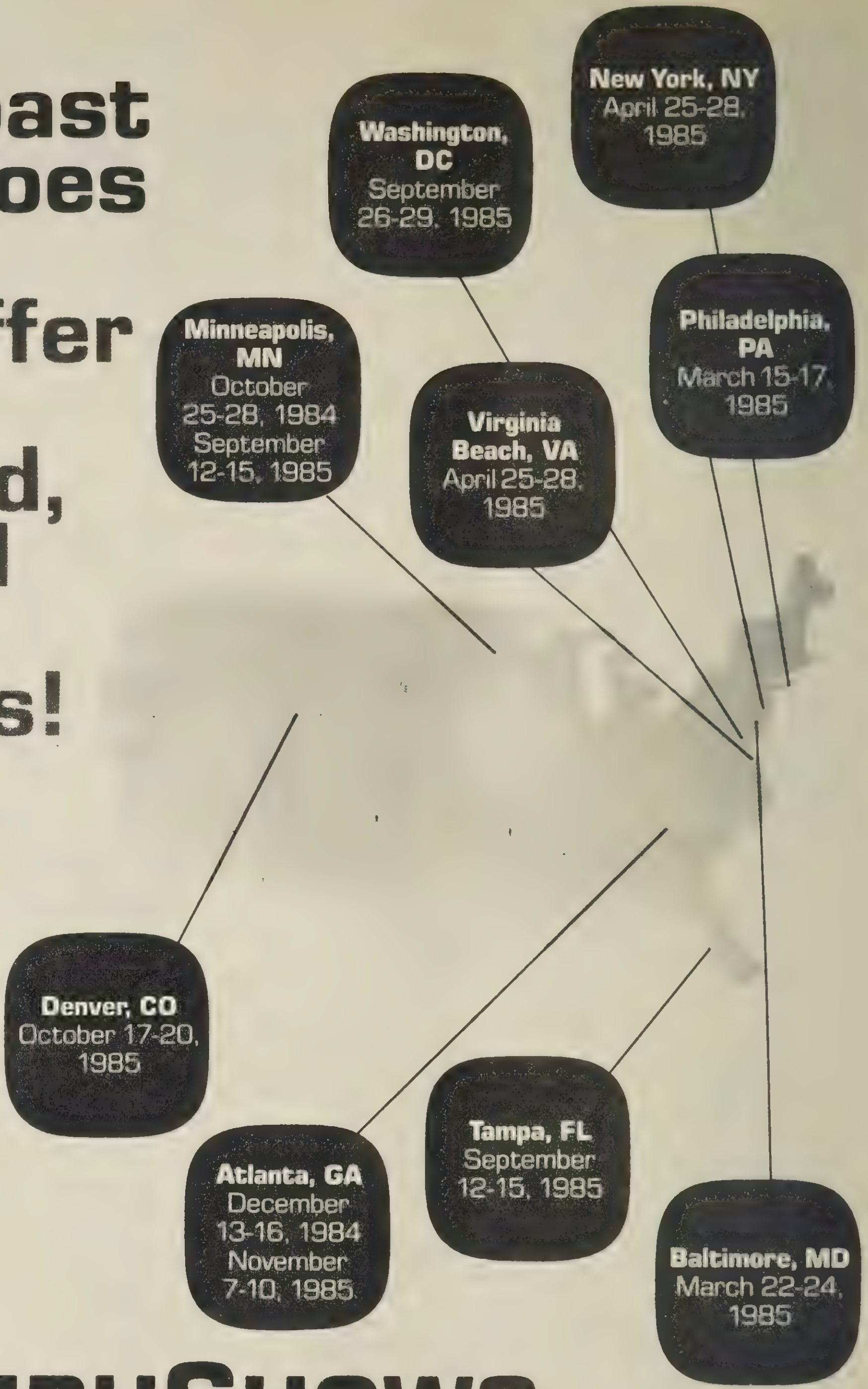

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Parity generation (if specified) will result in an extra bit being transmitted per character. If the receiving device expects parity bits and you don't send them then it will process every byte it receives as being in error; the same holds true for data which you receive. The reverse is also bad; if it doesn't expect parity and you do. It won't know what to make of the extra bits you send, and you will receive too few.

Parity (or not) is set by the bit labelled "PEN" (Parity ENable) a hex "10" in Figure 2. The type of parity generation (even or odd), is specified by the bit labelled "EP" (Even Parity) hex "20".

To generate even parity, you would set "PEN" = 1 and "EP" = 1 for a value of hex "10" + hex "20" = hex "30". In decimal, that would be 16 + 32 = 48. To generate no parity, you would set "PEN" = 0, and the value of "EP" would be ignored by the 8251.

3) "STOP" bits.

The number of stop bits is set by the two bits "S2" and "S1" in combination. Generally speaking printers seem to ignore extra stop bits; other computers may or may not. The bit values for "S2" and "S1" are hex "80" and hex "40" respectively; thus the value for two stop bits would be "S2" = 1, "S1" = 1 for a total of hex "80" + hex "40" = hex "C0". In decimal, this is 128 + 64 = 192.

4) BAUD Rate.

The BAUD rate is specified to the 8251 as a function of the data clock rate. The selection is controlled by the values given for the bits labelled "B2" and "B1", hex "02" and "01" respectively. As shown in Figure 1, the data clocks are both connected to the output from the clocking circuit (either IC 8 or IC 9 via IC 6), and are pins 9 and 25 of the 8251. Since the transmit and receive data clocks are separate pins on the 8251 it is theoretically possible to transmit and receive data at different rates; in actual practice this would be unusual to say the least.

Assuming that the data clocks are derived from IC 9, the clock rate would be 19.3 KHz (19,300 cps). From Figure 2, you have three possible BAUD rates available (using "B2" and "B1"): clock rate divided by 1, by 16 and by 64. The BAUD rates available in this configuration would therefore be 19.2 KB (very fast, and which I have not tried), 1.2 KB (or 1200 BAUD) and 300 BAUD. These would be specified as:

B2 = 0, B1 = 1 (total 0 + 1 = 1) for clock/1 = 19.2 KB/1 = 19.2 KB.

B2 = 1, B1 = 0 (total 2 + 0 = 2) for clock/16 = 19.2 KB/16 = 1200 BAUD.

B2 = 1, B1 = 1 (total 2 + 1 = 3) for clock/64 = 19.2 KB/64 = 300 BAUD.

Example of MODE Instruction

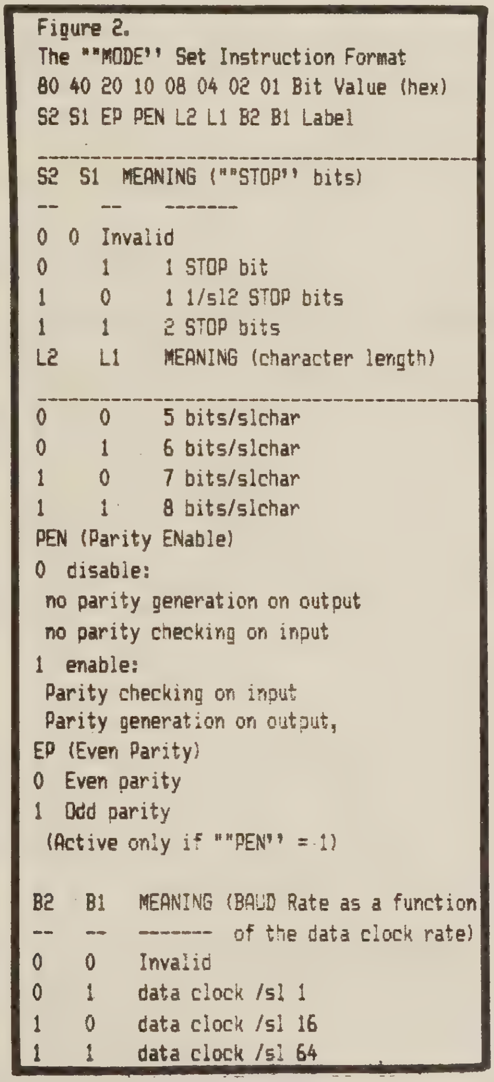
Let's assume you want to use the following setup:

Character length: 7 bits
Parity: even
Stop bits: 1
BAUD rate: 300

The MODE instruction value would be calculated as follows:

"L2" = 1, "L1" = 0 (7 bits/char), total 8 + 0 = 8.
"PEN" = 1 (enable parity), value = hex ""10".
"EP" = 1 (even parity), value = hex "20".
"S2" = 0, "S1" = 1 (1 stop bit), total = 0 + hex "40" = hex "40".
"B2" = 1, "B1" = 1 (300 BAUD), total = 2 + 1 = 3.

Totalling the above, we get hex "08" + "10" + "20" + "40" + "03" = hex "7B" (or decimal 123). Therefore the operating mode above would be set by "POKE"ing the value 123 into the control port.



```
Figure 2.
The ""MODE'' Set Instruction Format
80 40 20 10 08 04 02 01 Bit Value (hex)
S2 S1 EP PEN L2 L1 B2 B1 Label

-----------------------------------------
S2  S1  MEANING (""STOP'' bits)
--    --    -------
0  0  Invalid
0      1      1 STOP bit
1      0      1 1/sl2 STOP bits
1      1      2 STOP bits
L2     L1     MEANING (character length)

-----------------------------------------
0      0      5 bits/slchar
0      1      6 bits/slchar
1      0      7 bits/slchar
1      1      8 bits/slchar
PEN (Parity ENable)
0  disable:
 no parity generation on output
 no parity checking on input
1  enable:
 Parity checking on input
 Parity generation on output,
EP (Even Parity)
0  Even parity
1  Odd parity
 (Active only if ""PEN'' = 1)

B2   B1   MEANING (BAUD Rate as a function
--   --   -------  of the data clock rate)
0    0    Invalid
0    1    data clock /sl 1
1    0    data clock /sl 16
1    1    data clock /sl 64
```

The "COMMAND" Instruction.

Now that the 8251 has been told of the data format, we have to tell it what we expect it to do. This is accomplished by "POKE"ing the "COMMAND" instruction into the control port. We have already covered the "IR" (Internal Reset) command; now let's see what the rest of the command bits are for. (These are shown in table form in Figure 3).

Figure 3.
The ""COMMAND'' Instruction Format

80	40	20	10	08	04	02	01	Bit Value (hex)
EH	IR	RTS	ER	SBRK	RxEN	DTR	TxEN	Label

Bit MEANINGS
EH : not used (synchronous mode only).
IR : Internal Reset.
1 = reset the USART.
RTS : Request To Send control.
(not required)
ER : Error Reset.
1 = reset error status flag.
SBRK : Send BReaK.
(pretty exotic)
RxEN : Receive ENable
1 = get ready to receive data
DTR : Data Terminal Ready control.
(not required)
TxEN : Transmit ENable.
1 = get ready to send data.

"EH" (Enter Hunt) hex "80" is only used in the "synchronous" mode of the 8251 and is not applicable to most micro applications.

"RTS" (Request To Send) hex "20" will set pin 23 of the 8251 low; possibly useful for an exotic application.

"ER" (Error Reset) hex "10" will set the status read error flags ("PE", "OE", and "FE", Figure 4) OFF. The 8251 will continue to function after an error condition occurs, but if you want to keep track of errors it is best to reset the error flags as you go.

"SBRK" (Send BReaK) hex "08" will send a "break" signal. Some main frame computer terminal programs will recognize this as a "quit transmission" signal.

"RxEN" (Receive ENable) hex "04" tells the 8251 that you expect to receive data.

"DTR" (Data Terminal Ready) hex "02" if on will force pin 24 of the 8251 low. Again, not too useful normally.

"TxEN" (Transmit ENable) hex "01" tells the 8251 that you will be sending data.

COMMAND Instruction Example

To ready the 8251 to transmit and receive data, you would code the "COMMAND" instruction as follows:

"EH", "IR", "RTS", "SBRK", and "DTR" all set OFF (0).

"ER" (hex "10"), "RxEN" (hex "04"), and "TxEN" (hex "01") would all be set ON. This would give us a value of hex "15" or decimal 21 to "POKE" into the control port.

Status Read Flags.

Now that the 8251 is ready to work you can start sending and receiving data. The problem is, though, how are you to know when a byte has been received, or when it is time to send another? The 8251 will supply the answer to these and many other questions by way of status bits which you obtain by reading ("PEEK"ing) the control port. This operationis just as simple as it sounds: every time you "PEEK" the control port, you will get a value which is the sum of all the flag bits currently "ON". This "status read" does not interfere in any on-going operation in which the 8251 is engaged, nor does it change any of the settings you so laboriously set up with the "MODE" or "COMMAND" instructions. The various flags are shown in the table in Figure 4.

Figure 4.
The 8251 Status Flags

80	40	20	10	08	04	02	01	Bit Value (hex
DSR	SYNDET	FE	DE	PE	TxMT	RxRDY	TxRDY	Label

Bit Meanings:
DSR : Data Set Ready.
(only used by some printers)
SYNDET : Break received.
1 = break was received.
FE : Framing Error.
1 = invalid character received.
(probably timing or wrong BAUD rate).
OE : Overrun Error.
1 = DATA lost: your program was too slow to accept a byte.
PE : Parity Error.
1 = xmsn error, or wrong parity.
TxMT : Transmitter eMpTy.
1 = ready to send another character.
RxRDY : Receiver ReaDY.
1 = received byte ready for CPU.
TxRDY : Transmitter ReaDY.
1 = Transmit buffer can accept another byte to send.

Figure 5.
RS232 Standard for 25 pin ""D'' connector plug.

PIN	USE (USART)	CONNECT TO
MALE plug to modem		
3	Receive data	Pin 1 on 1489
2	Transmit data	Pin 11 on 1488
1	ground	CPU ground
0	ground	CPU ground
FEMALE plug to printer.		
3	Transmit data	Pin 11 on 1488
20	Printer Ready	Pin 13 on 1489
1	ground	CPU ground
7	ground	CPU ground

"DSR" (Data Set Ready) hex "80" is set to 1 if the signal at pin 22 of the 8251 goes LOW. On the wiring diagram (Figure 1), you will note that the 1489 pin 4 is tied high. Since the 1489 is an inverter this forces a low condition to pin 22 of the 8251 causing the "DSR" flag to always be ON (1). This is the kind of setup to use with a modem since they don't generally use this signal anyway. With some printers, however, this signal is used to indicate that the printer buffer is full, out of paper, etc. In this case do not connect this pin on the 1489 to +5 as shown, but leave it connected only to the printer through the RS232 cable. This way the printer signal will be reflected through the 1489 to the 8251 to alert your program to stop sending data. The "DSR" bit will normally go "ON" when the printer cannot accept data.

"SYNDET" (Break received) hex "40" will not normally be on, since it is unlikely your micro would receive a "break" signal.

"FE" (Framing Error) hex "20" is set if the 8251 did not receive a valid STOP bit following a data character.

"OE" (Overrun Error) hex "10" is set if a second character was received before yourprogram accepted the preceeding one. The 8251 will continue working, but you will have lost the preceeding data byte.

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"PE" (Parity Error) hex "08" is set if the 8251 detects a parity error on a received character. This will not inhibit the operation of the 8251, but you can assume that the character received is bad. This can also be caused by not having the same parity generation and checking at both ends of the transmission.

"TxMT" (Transmit buffer eMpTy) hex "04" indicates that the 8251 transmit buffer is empty (ready to accept another byte to send).

"RxRDY" (Receiver ReaDY) hex "02" indicates that a character is ready to be accepted by the CPU.

"TxRDY" (Transmitter ReaDY) hex "01" means roughly the same as "TxMT" - another byte can be sent.

Programming the 8251

As can be seen by the fore-going, the basic steps in a terminal program would be:

1) Initialize the 8251 to send and receive.
2) Check the status flags for "RxRDY"; if it is on accept, translate and display the character.
3) Check the keyboard for activity. Translate and send it if "TxMT" and "TxRDY" flags are on.
4) Keep on looping through steps 2 and 3 until some "QUIT" condition is hit.

Figure 6 is a sample BASIC program showing the steps above. I left it deliberately simplistic; it will read and display a message from the modem, then turn around and accept and send a message from the keyboard. It then loops back to read the modem, and on, and on.

- Lines 10 and 20 assign labels to the addresses of the control port ("C" - 8193) and data port ("D" - 8192).
- Line 30 assigns a label to the value of the mode set instruction ("M" - 123; 7 BITS/char, even parity, 300 BAUD and 1 stop bit).
- Line 40 assigns a label to the status flags "ready to send".
- Lines 100 through 130 initialize the 8251; first the reset command (line 110), then the mode instruction followed by the command.
- Lines 200 through 250 read from the modem. Line 220 loops until "RxRDY" comes on, then a character is collected into "X$". When carriage return is detected ("13"), the routine exits.
- Lines 310 through 360 translate (roughly) the ASCII data to Sinclair. For simplicity, this routine will only accept alphanumerics ("0" through "9', and "A" through "Z").
- Line 370 prints the translated character(s) on the screen.
- Once the incoming message has been displayed, the program turns around and reads from the keyboard (Lines 410 and 420).
- Lines 510 through 530 then set the 8251 into "send" mode, and lines 610 through 670 translate from Sinclair into ASCII.

Lines 700 through 720 send your message, checking the status of the 8251 in line 700.

When the message is sent, lines 800 onward send a carriage return, then go back to the data read routine.

For the machine code enthusiasts the same principles apply, except that with the increased speed of excution more elegant routines can be used. The USART can be initialized for both input and output so that you can be sending while data is being received. Translating of the data between Sinclair and ASCII can also be considerably enhanced, allowing upper and lower case alpha and special characters.

I will get into the machine code programming in a subsequent article, as it can be pretty heavy going if you are not experienced. So long for this month, and happy coding!

```
  5 REM *** SET UP LABELS ***
 10 LET C=8193
 20 LET D=C-1
 30 LET M=123
 40 LET OK=5
 95 REM *** INIT TO RECEIVE **
100 FAST
110 POKE C,64
120 POKE C,M
130 POKE C,20
195 REM *** READ FROM MODEM **
200 LET X$=""
220 IF PEEK C=OK THEN GOTO 210
225 REM *** MOVE DATA TO X$ **
230 LET X$=X$+CHR$ (PEEK D)
240 IF PEEK D=13 THEN GOTO 300
250 GOTO 220
305 REM *** XLATE MSG ***
310 FOR P=1 TO LEN X$
330 LET Y=CODE X$(P)
335 IF Y>90 THEN LET Y=Y-32
340 LET Y=Y-27
350 IF Y<31 THEN LET Y=Y+7
360 IF Y<20 THEN LET Y=0
365 REM *** PRINT EACH CHAR **
370 PRINT CHR$ Y;
380 NEXT P
390 PRINT
405 REM *** GET MSG TO SEND **
410 INPUT X$
420 CLS
505 REM *** INIT TO SEND ***
510 POKE C,64
520 POKE C,M
530 POKE C,17
540 SLOW
605 REM *** SEND MSG ***
610 FOR Q=1 TO LEN X$
620 LET Y$=X$(Q)
630 LET Y=CODE Y$
635 REM *** XLATE TO ASCII ***
640 IF Y$<"A" THEN LET Y=Y+20
650 IF Y$>"9" THEN LET Y=Y+27
660 IF Y$=" " THEN LET Y=32
670 IF Y$="." THEN LET Y=46
695 REM *** SEND CHAR ***
700 IF PEEK C<>OK THEN GOTO 70
710 POKE D,Y
720 NEXT Q
795 REM *** SEND CARRIAGE RTRN
800 IF PEEK C<>OK THEN GOTO 80
810 POKE D,13
815 REM *** NOW READ AGAIN ***
820 IF PEEK C<>OK THEN GOTO 82
830 GOTO 100
```

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Hewlett — Packard 125

Eugene Werner

To the hp fans ...

While waiting to see if the readership wants some articles on the larger sized Hewlett-Packard pc's (the 125 and the 150), I decided to provide this answer to what I have seen to be a bottle-neck in efficient use of the hp125.

Have you ever wanted to set up a disk so it would "auto- boot" directly into a desired program? You can!...But not by using the accepted CP/M method in the Base Page! Most people do not know that the hp125 uses the autoboot method to load the so called WELCOME file (Actually only a normal application program). All the user has to do is substitute his/her own desired file in its place... and Here's how.

....(This is shown in abbreviated form for brevity)... NOTE AND RECORD THE BIOS REVISION NUMBER ON A SHEET OF PAPER WHEN YOU BOOT-UP THE SYSTEM...you will need it in step 7 below. • 1. FORMAT a disk. • 2. COPY only the SYSTEM to the newly formatted disk. note: If you now place the newly copied disk in "A" drive and then EXIT COPY, you will see

WELCOME?

displayed on the screen. This is correct.

• 3. Place newly formatted disk (with only the operating system on it) in the "B" drive. • 4. Assuming you want to autoload a BASIC application program... PIP both MBASIC.COM and your application program
(example: MOVEIT.BAS) to the new disk.

• 5. LOAD Ward Christianson's wonderful public domain program called DU
Disk Utility) through the "A" Drive.

• 6. Log in the "B" drive (type LB and then a CR) • 7. Look at the following table and (Using the disk type and BIOS Revision number for the system you are using),identify the location of Hewlett-Packard's own auto-boot file (called the WELCOME file)

use printout form

* : So far as I know,this format was never issued by hp. Users may have added the hp9121 drive to their systems and loaded the SYSTEM on the new disk format.

NOTES: 1. The (T)rack and (S)ector numbering is as displayed by the DU program. 2. If in the correct location, the screen should look like this:

```
                                                  * ( filled with )*
00
10                 (filled with HEX code)            * ( 1st 7 bit )*
20                                                 * (ASCII equivlnt)*
30 0857454C 434F4D45 20C300EB C34C0000 * .WELCOME C.kCL..*
40                                     *          *
50                                     *          *
etc.                                  etc.        *
```

The "W" in WELCOME is the beginning of the 8 character maximum autoload.

PLEASE NOTICE the eighth character is "20" (in hexcode...a space).

• 8. Using normal DU procedures, change this group of ONLY eight (8) characters into any filename(s) you desire for autoload.

EXAMPLES:
MYFILE.COM or "test.me" (typed in lower case !)
or
Protect your files from accidental erasure by:
For Example:
..load MBASIC.COM as.."bas"..(in lower case)
and
your application called MOVEIT.BAS..

as..."mov"...
Then...the eight character autoload becomes

bas()mov()

REMEMBER: a .COM file can be called without the file type designator; and when in BASIC, a .BAS file can be called without the file type designator

ALSO: files names are read from lower memory to upper memory locations...therefore put the "slave" program after the "master" program and not before!

• 9. Using normal DU procedures, GET group 00 and change the file names to the same EXACT names you used in the autoload call area.

• 10. After inserting the new preload code, EXIT the DU program (touch "X" key).

• 11. Type DIR B: and you should see your two programs on screen in lower case.

• 12. Remove what ever disk you used in the "A" drive and move the new disk to the "A" drive.

Press softkey (f6) LOAD OP SYS

• 13. If you used the BASIC plus application given as the example above, you would see displayed on screen:

```
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Version 2.2

HP Bios Rev. A.01.40 5/2/83
```

CONT WERNER Pg. 78

64 Column Mode Software

for the Timex Sinclair 2068

Paul Banasik

How would you like to be able to place on the screen 24 rows of 64 characters in your own programs? Or how about plotting in an ultra-high resolution mode of 192 vertical pixels by 512 horizontal pixels? Sound enticing? Then read on...

Basically speaking, I have developed several small machine code routines which handle the available 64 column mode on the Timex Sinclair 2068. There are 5 routines which are labeled: INITIALIZE, PRINT, CLS, PLOT, and UNPLOT. In this article I will present the actual machine code along with how to use it in your own BASIC programs. The process of controlling the display is really easy, as you will soon see.

The Machine Code

To use the 64 column mode of the 2068, you must have the machine code in the computer. The code begins at RAM location 56000 and ends at 56372. To get the code placed in RAM type in Listing 1 and save it on tape, as you will be needing this routine later on (also, if the system should crash at any point you can simply re- load the program back in). Type RUN and ENTER. you will have to wait for a couple of seconds while the code is being placed in RAM. If, at any time, you get an error code (OUT OF DATA), you should recheck your typed in program against the listing and correct whatever is missing from the DATA list. If you get an OK then continue onward, else keep trying until the program executes correctly.**BE SURE TO SAVE THE WORKING PROGRAM WHEN IT IS COMPLETED.**

Using the Machine Code

To see a demonstration of the code's capabilities, type in Listing 2 and RUN it (with Listing 1 still in the computer). You should see several random characters being placed on the screen, then the screen should clear, and then several plotted *jpoints on the screen. Then every single point on the screen will be taken off individually, and the process will repeat itself until you BREAK the program. If you type CLS, and there is still some garbage on the screen, then type LET C = USR 56136. This is just a simple demo, for the next section will explain how to use the code in your own applications.

Using the Code in Your Own Programs

The five available machine code routines will each be explained separately in this section. Use the information for your own applications.

To INITIALIZE the screen for the 64 column mode, type LET C = USR 56000. This MUST be done immediately after the code is placed in RAM, as the re-organization of RAM is necessary for the functioning of the rest of the code.

To PRINT a character on the screen, use these four steps:

1.) POKE 56373 with the line that the character will be on (0- 23).
2.) POKE 56374 with the column that the character will be on (0- 63).
3.) POKE 56375 with the character code of the character to be placed at the designated line and column (32-127).
4.) Type LET C = USR 56022

To CLEAR the SCREEN, simply type LET C = USR 56136. The entire screen will be cleared.

PLOTting on a 192 by a 512 resolution screen is the most difficult routine to handle. Use these steps:

1.) POKE 56377 with a 0 if you want to plot on the first 256 X-coordinates (0-255), or POKE 56377 with a 1 for the next 256 positions (256-511). DO NOT USE ANY VALUES OTHER THAN 0 OR 1!
2.) POKE 56376 with 0 to 255 for the X-coordinates within either the range of 0 to 255 or the range of 256 to 511.
3.) POKE 56378 with the Y-coordinate (0-191), where 0 is the top of the screen and 191 is the bottom of the screen.
4.) Type LET C = USR 56167

To UNPLOT, or remove a point from the screen, use the same process as above, except for step 4 type LET C = USR 56270.

Some Final Notes

to change the colors on the screen, type OUT 255,X where X is the value from the below chart:

PAPER	INK	VALUE
White	Black	6
Yellow	Blue	14
Cyan	Red	22
Green	Magenta	30
Magenta	Green	38
Red	Cyan	46
Blue	Yellow	54
Black	White	62

CONT BANASIK Pg. 78

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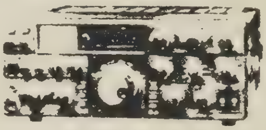

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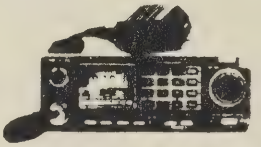

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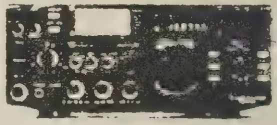

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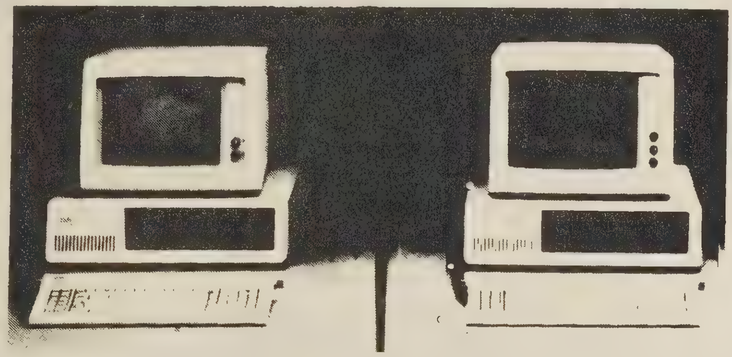

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FROM WERNER Pg. 74

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application)...

- 14. By loading these programs in lower case, all normal files created or moved by future regular operations will be in upper case and can be handled without worrying about the effect on the lower case files. Sound familiar??...This is just what hp does to protect their "welcome.tbl" (which you will recall is also in lower case).
- 15. LOTS OF LUCK IN YOUR COMPUTING... your on your own!

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Send any comments about the above procedure, desired topics, questions about how to do .... etc. to me and I'll try to answer in the pages of this magazine...If Chet will allow...it is his final decision that counts. Eugene D. Werner
11006 Jean Road
Huntsville, Al 35803

CTM

TELL THEM YOU SAW THEIR AD IN
COMPUTER TRADER MAGAZINE

FROM BANASIK Pg. 75

Before using the code, type CLEAR 55999. This will protect the code from NEW and from being over-written by BASIC.

TO save THE CODE, type:
SAVE "file name" CODE 56000,373

To LOAD the code, type: LOAD "file name" CODE 56000,373

IF YOU HAVE ANY DIFFICULTY WITH using the machine code or programs, please feel free to write to me at this address:
Paul Banasik
14305 Bidwell Ave.
Cleveland, OH 44111

CTM

Also, if you want to buy a tape with the demo program and another 64 column program, please let me know. I.'ll write to you and let you know how much it will cost.

I hope that you find a use for this software. If not, then just HAVE FUN!!

The machine code for this article will be listed in next months **CTM**.

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JOIN THE CBM 64

James F. Jarrett

I had full intentions of starting my series on the CBM 64 in the area of BASIC programing, giving useful utilities and then give you several text inputing formats which may be novel in order to show how a useful wordprocessor can be made to suit your own custom needs. From there, who knows. But, I love to review programs and software packages from games to business and personal applications.

This is how I will introduce myself to the Commodore 64 audience and that is to review several useful software utilities that may be of great interest to many of you.

These reviews are done on a users level, and are not based on how the program is written. Sloppy code can, of course, be streamlined, but the net outcome can produce a very useful package. The following are packages from large companies and vendors. I do however prefer to review the packages designed by the computer entrepreneur who is trying to make it on his own.

A while back I needed a BASIC compiler to compile several Basic programs I had written into a faster version of code. My problem was, of course, finances in that I did not want to spend around $80.00 to over $100.00 for a compiler. My wait paid off when Abacus Software, P.O. Box 7211, Grand Rapids, MI 49510, introduced it's BASIC 64 COMPILER for $39.95.

I quickly ordered and promptly received a disk and partial manual for the compiler. Upon attempting to LOAD the disk, nothing ever happened, but an overheated disk drive. It did not load. A letter and return of the disk solved the problem. A phone call after the new disk arrived answered my question as to what happened? Apparently, manufacturers are taking newer and more drastic measures to protect themselves from piracy. The first disks duplicated had a problem in them as they would not load on any system. Abacus did resolve the problem and very promptly. A sign of a good conscientious company.

I own both a 1540, reROMed to a 1541 and a 1541 disk drive. My first attempts to load the new disk came up with a system error when using my 1540. I had no problem using the 1541 as device 8, which the compiler defaults to. I was concerned about the partial manual, but after returning the registration card, I received the remaining pages and a vinyl three ring binder for the documentation. The additional pages answered numerous questions about using the compiler.

A compiler generates P-Code or psuedo-code. This is compatible with the Basic ROM, and must use the Basic ROM. If you Poke the Basic ROM out of the system, nothing will happen. Basic 64 Compiler utilizes two different P-Codes called Optimizer 1 and Optimizer 2. Each seems to compile a basic program in a different way with Compiler Optimizer 2 being quicker in program execution.

You must have a disk drive to use the compiler as it reads the Basic program file, compiles and writes it back to the disk under the program name, P-progname. If you LOAD and LIST a compiled program, only one line appears with SYS. You can RUN the program as usual. This is a good protection scheme so that a software pirate could not list and then rewrite your program for resale.

Basic 64 Compiler also allows you to generate true 6502/6510 machine code using the advanced development features. This is the quickest yet, but I don't fully understand why the compiled program needs a "Run Time" module. This adds to the number of Blocks used to store the program on the diskette. If it were true machine code, no run time module would be needed. However, it is close enough and your program can run with the Basic ROM being poked out of the machine giving you another 8K of RAM for your program.

Basic 64 Compiler has numerous other options for the advanced programmer and is easy to use. The documentation in my mind is lacking somewhat, but that can be overlooked, especially for the price.

One of the nice things that can be done is the compiling of a basic program into a machine language subroutine that a Basic program can use. In your compiled version, however, Basic must be relocated above the string storage for the compiled program. Generally, Basic will have to be relocated above 8000 decimal. This will allow your Basic program to reside above the machine language program. Then all you have to do is SYS to your subroutine.

On my scale of 1 to 10, with all aspects of Basic 64 Compiler considered, I give it an 8. There are better on the market, but the price was the determining factor, and Abacus' service was outstanding.

If you have any software that you would like me to review for possible inclusion, please send it to me. If you know of any software that you'd like to have reveiwed, let me know what it is.

Until next time, take care!

John F. Jarrett
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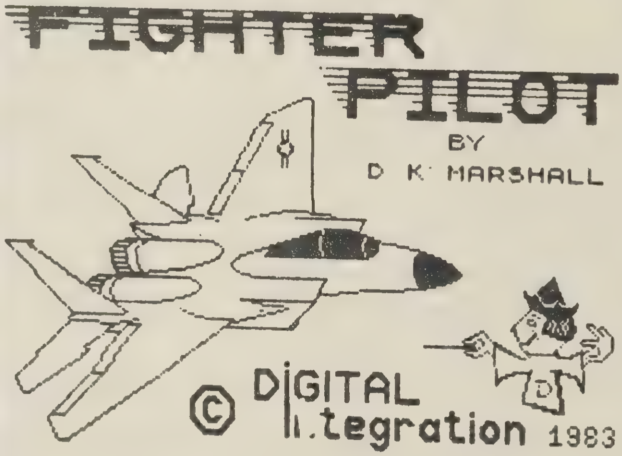

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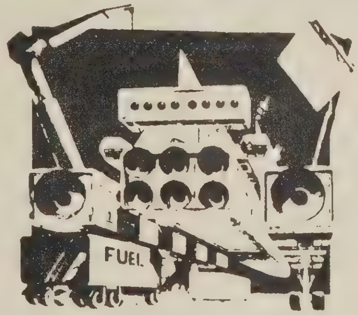

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Letters

Staff

Feb 22, 85
Dear Chet:

First of all, Chet, thanks for making the address change on my ad for DISK O' UTILITIES which has been running in **CTM** for all this time.

Secondly, I have enclosed a stat of the ad I'd like to replace it with. This ad is for our other software package, DISKINVOICE SYSTEM, which is finally beginning to take off.

While I have your ear, I thought you might be interested in our company policy regarding copy protection of software. I'll quote from the opening paragraphs of the DISKINVOICE documentation:
"You will, no doubt, notice that your DISKINVOICE SYSTEM disks are **unprotected** — that is, all programs and files are listable, modifiable and copyable. We at BROADWAY SOFTWARE strongly believe that **all** business and other professional software should be accessible to the buyer, so that he or she may customize or update it to any degree desirable, and make back-up copies as needed for protection of important business records. We supply our software in this fashion with the full awareness that it might be "ripped off" by the unscrupulous, and that we may lose a few sales as a result. We sincerely believe, however, that our policy will prove to be the more intelligent in the long run, and that the overwhelming majority of our customers, who are primarily business and professional people rather than game players or "computer hackers", will reward us with their goodwill and future business."

And, in a nutshell, that's how we do business. Thanks, Chet, for your help in the past. I'm honestly impressed with all you've done with **COMPUTER TRADER** MAGAZINE since I first came aboard many months ago.
Best wishes to you.
Sincerely,
sgd/Wendell Craig, President
BROADWAY SOFTWARE

Wendell thanks for your letter. And more than that, thanks for letting my readers know your policy on disk protection. I sure wish more software companies had your "guts". I know what a difficult decision it must have been to know you would loose some customers, but in the long run, you probably have gained more than the few you lost.

I applaud your stand on this.

From previous letters I know you are selling some of your products through **CTM** ads. I just wish I could get my Apple going so I could give a product review of your DISKINVOICE program. I have really had problems getting my Apple II+ fixed. I have a friend Jim Pittman who says he has found out what the trouble is and now if I can just find a U5 AY-5-3600 Keyboard Encoder ROM, I may have it fixed. I have other computers now, and my Apple isn't nearly as important as it use to be but it is still a valuable piece of equipment.

I wish you well in your business and thanks for the kind words about **CTM**. You are not alone in your thinking. Many people are really surprised just how far **CTM** has grown during our first four years. Chet

• • • • •

February 24, 85
Hello Chet:

Ihope you had a nice trip in Florida.

I wasn't too pleased with the Feb/85 issue, but I know that you have been rather busy. I'm sure some others are disappointed in lack of T/S programs, to type in.

I am wondering if you may have forgotten to send my Sinclair Users, book Back!!. Would appreciate your looking into this.

I will help all i can to support **CTM**.
Sincerely,
sgd/W.E. Walker

Thanks for your letter W.E. and support. I am sorry you didn't like the February issue. However, you seem to be in a minority, I got great compliments on it and some of the were T/S users. I have an idea you are one of the persons who take time out and write to our writers. But, other subscribers may now and our writers just may not know the kind of articles you are wanting. If you write to them, let them know how much they are appreciated, and the type of articles you want, each issue may just be to your liking. The problem with that, others may want a different kind. That is why I try to have something for "everyone" in each issue. So far, I think I am accomplishing just that.

Thanks so much for sending me your copy of **Sinclairs User** magazine from England. It is a great magazine and I am hoping I will be able to get some advertisers from it. I am in the process and I was when I got your last card, on copying addresses down to send a sample copy and rate card. It will take time and money but I am hopeful it will pay off.

I returned your magazine last week and you should have it well before you read this. Thanks again for your support. Chet

• • • • •

Feb. 26, 1985
Dear Chet:

Just a quick note to tell you that the the dam has finally burst. The US mail finally came through. The card you sent me arrived on Sat. the 23rd and in the same mail was the December **CTM** in fresh, unspoiled newsstand condition.

A card that I wrote celebrating this didn't get ii yesterday's mail and just s well as the Jan. copy of **CTM** finally appeared, however, this one a little worse for wear but still enjoyablly readable.

What will the next mail bring? Perhaps I should tell you that **CTM** is not the only computer magazine problem I have. T/S Horizons Jan. issue came on the 22. SyncWare News has not made an appearance since the Nov/Dec issue. My son subscribes to Business Week and yesterday the Feb 18, and the Mar 4 issue arrived together. His copies of Sports Illustrated also are erratic. The US mail doesn't care which magazine is late.

Several years, scratch that, months ago I received a magazine (not computer) from the West coast and they had problems sending to certain areas and they finally put the mailing date right on the front cover. I never heard as to whether it helped or not but my area did not seem to be one of their trouble spots as it came with fairly uniform regularity.

It would not be right for me to close without telling you how much I enjoy **CTM** and all the writers you have. Although I am not in the habit of corresponding with authors I think I had better because I enjoy them all, even when they write about other computers than Sinclair's. Also I will make a special point to tell your advertisers of their insertions, although that will not be too frequent as I am not that much in the market for their wares. Being retired has certain financial restrictions.

Sincerely yours,
sgd/Oscar P. Marsh

Thanks Oscar for taking time to write and I am glad you are getting your copies of **CTM** on time now. I wish there was something I could do but all I can suggest is that those of you who are not getting your issue out and if you know when it was placed in the mail, you contact your local post office. I can't remember just who it was that told me the following but he told it in truth. If you are still out there please let me hear from you. This subscriber complained to his postman about the magazine being late and said more or less he was going to report it to higher authorities about the lateness. And lo and behold, it hasn't been late since. I wonder why????

It is good to know that **CTM** isn't the only magazine you get late, but it doesn't do any good in getting to you sooner. If my new plans and my printing company help, I am in great hopes you will be getting your issue on time in the future. Chet

• • • • •

2 March 1985
Dear Chet:

I got my latest (Feb 85 issue) of **CTM** and I am really impressed at the quality improvement thanks to the new typesetting. I am sure many of your readers immediately noticed it also.

I hope your readers found my initial article on John Oliger's expansion system for ZX/TS computers interesting. As the article mentioned, additional information about the Oliger kits could be obtained by writing:

John Oliger Co.
11601 Whidbey Drive
Cumberland, IN 46229

Hopefully, you will have received my next two installments, Parts II and III. These go into practical uses of the expansion system. In parts II and III, frequent use is made of an excellent machine code utility, "HOT-Z", by Ray Kingsley of Sinware. If I didn't mention it in the article, please add that HOT-Z can be obtained from:

Sinware
P.O. Box 8032
Santa Fe, NM 87504

I had the first version of HOT-Z, but now there is an improved "HOT-Z II". Write to Ray Kingsley at the above address for more details.

Also, if your ZX/Ts Users want more information about the Oliger Video Upgrade, i recommend they take out a subscription to "SYNCWARE NEWS", and start with Vol. 2, No. 1. Volume 2: No 1 and Volume 2: No. 2 went into details on the Oliger Video Upgrade. Succeeding volumes will give more information.

SYNCWARE NEWS
P. O. Box 64
Jefferson, NH 03583
$16.95/Year (6 issues)

Now, to whet the appetite of my fellow 2068 users, I am planning follow-on articles on John Oligers new expansion interface for the 2068. To start with, we'll discuss the RGB interface for highest quality color and the Centronics Parallel printer interface for full size printers.

Thanks sincerely,
sgd/Tony Gomez

Thanks for the addotopma information Tony. I'm sure many of our readers found the information very useful. Naturally, we all are looking forward in your next writings.

Keep the articles coming in and if possible several at one time. That way I can do what I said earlier in this issue. Chet

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3-2-85
Hi Chet: I am sending you my article for March. I am also sending a revised copy of my ad for the 2068 tape. I was pleased to see my letter in last months issue. I hope it will get you more writers. I want you send me a letter and let me know just how to use your BBS. I need to know how to set my modem. That is the word length, the parity, and number os stop bits and duplex. Also is there a password i need to get in? I am somewhat new to telecommunications racket. I also need to know if you feel that a video artist program I hae should be broken into more than two articles. It is a LONG program! It is about twich as long as the CHECK program. I think it's better than some of the commercial drawing programs.
sgd/James DuPuy

Thanks James for your writings and don't worry about the length of your articles. If I should find them too long, I will just find a convenient place and make it into more than one part. No problem...

As for using our local BBS,it isn't hard. I take 8 bits, no parity, 1 stop bit. As for the password, you can use **CTM** to get you in and then you can change it to whatever you want after getting access. The board is menu driven and you will upload into directory C;99. After uploading go to the E-Mail section and leave me a message letting me know what the name of the file is so I can go and down-load the article. The main problem is the BBS is going down June 15th I believe. I will try and find other boards. Look in the my "Chats" and you will find the type and kind of disk I can read. You may want to send me a disk I can read with your article.

I would imagine several of our readers would be more than interested in your new artist program. Send it in... Chet

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March 2, 1985
Dear Chet:

I enjoy your magazine very much, but would enjoy it much more if there was something for the TI-994A in it. As you know there is over 2 million of them out over the world and I have two of them. If you can't find anything to write about the TI-99/4A, how about Ham related articles?
sgd/John E. Bagwell, W4DQK

I have to agree with you John, it would be great if we had more articles on the TI-99/4A computer. If you know how to get them to write, please let me know. At one time, we had several writers but now no ones wants to write about it. I would just love to see some articles on it. How about you giving it a try? I bet there are many others out there that would like to get your ideas on paper.

We have several Ham related articles in this issue and I hope you find them enjoyable. I would also like to have more of them too. You might consider writing some ham related articles also. Chet

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3-14-85
Chet:

My last letter to you (Feb '85 Letters) was a quickie that I put together concerning general changes in the tax law. I agree with you 110/pu8 that a CPA should be contacted to evaluate a specific situation. I am not a CPA and do recommend that interested parties contact their CPA or consultant for detailed pertinent information. I noticed one printing error and would like to correct that right now. New income averaging provisions specify a $3000 income threshold, not the $300 threshold that was printed. It does not matter where the mistake crept in, only that it is corrected so that no one is seriously mislead.

I have rehashed my position so many times concerning not being able to justify my writing to others, so I'll skip it and let you in on what I'm currently working on. Several months agp upi gave me 78 switch keyboard. I've just recently been able to disassemble it and I think I can interface the unit in parallel with the ZX81/TS1000 keyboard. With no access to keyboard specific documentation it has been slow going determining all of the pin-outs. Looks like that to re-work the keyboard I will have to totally redesign and produce a new PC board when able to. Point-to-point or wire-wrap wiring is out of the question. I've also recently purchased from Radio Shack a surplus TI 99/4A 48 switch keyboard and trying to interface it. All lines on the Hazeltine keyboard need to be changed, but only about 25% of the keys on the TI need to be modified for ZX81 input.

Assuming I can either rework the PC board myself, or find some good free technical help in redesigning and building a new PC board, I'll write'er up for **CTM** readers.

I've also got another construction in the works but editor at 73 says publication delays are about 6 months - 1 year.

The Hazeltine keyboard you sent me and the TI keyboard are of totally different design and will require different kinds of mods. One problem you or your readers might help me with immediately is the wiring of Automatically shifted keys. Both the Hazeltine and TI keyboards have Extra keys, 6 for the TI and 36 for Hazeltine. I would like to use many of these keys for control functions, but that requires that the key be shifted automatically. Both Gary Smith and myself agree that the keyboard conversion article in the Vol 1, No 1 issue of Syntax Quarterly is one of the best ones around, but it doesn't adequately explain the method used to implement shiftedkeys nor the IC based alternative. Another article mentioned is in the June '81 issue of SQ (CQ?) and implements an IC based circuit to generate shifted functions. I'd like to get hold of a copy of that issue or a photo copy of the article if you or one of the **CTM** readers has one to spare.

The TI keyboard cost me $3.00 at Radio Shack on Sale and would make an excellent external keyboard for the ZX81, but I've run into major problems interfacing it also. The TI keyboard is constructed with one single-sided PC board and a membrane overlay between it and the keys themselves. The signals it generates are strictly X-Y matrix unencoded and can be modified for ZX81 compatibility. Most positive action keyboards i'm familiar with use a double-sided PC board underneath the keys. With this type of construction it is a relatively straightforward task to cut traces, drill holes, and run jumper wires to complete the needed circuit. The TI keyboard is not constructed in this manner and the unmodifiable membrane makes it very hard to get the proper X- Y coordinates. If anyone out there has an first-hand experience with this particular keyboard or knows of a relatively simple IC- based circuit to read & decode the TI signals and generate the ZX81 signals I sure would appreciate any help or advice. If you can help me on this project please send any comments to Gary Hearn c/o **CTM** and Chet will forward them to me.

If you, Chet can pick up articles left on a local BBS maybe I can contribute a few more articles on the ZX81. I also have a couple nifty programs that might interest your readers. One program does Ohm's law calculations and other electronic circuit functions. The other is for Dipole antenna design. These might possibly be of some interest and use by **CTM** hams.

Chet, here is a load/save tip for **CTM** readers: The cassette recorder I'm using with the ZX81 is an inexpensive G.E. brand and has a motor speed control that widl allow a speed change of + - 20%. I don't have the means to precisely measure the BAUD rate I'm getting at normal tape speed, but have found through trial-and-error that during loads a +20% tape speed increase will still be tolerated on my ZX81 with the added benefit that the input signal level is also increased due to the increased tape speed, BAUD rate, and frequency shift. Although the baud rate is still well below the + - 10% baud rate used on the TS2068, using this technique has helped me at times to load programs that just wouldn't load normally.

I just received some literature from Oberon International describing their Omni-Reader. One of your columns you mentioned that you might get an evaluation unit (**CTM** Sept '84). Do you have any comments? Is it worth the $$$.$$ for use in business with a lot of word processing? I don't know enough about the product to comment, but thought you might. When I contacted Oberon requesting info I mentioned that I read about it in CTM

I also called DoKay for info on products not advertised in **CTM** and they too have the 48 key TI keyboards mentioned earlier for those that care.

It has also come to my attention that the Byte-Back Company has TS2068 upgrades for its MD2 Smart Modems that run on the ZX81/TS1000. If this TS2068 product is as reliable as the MD-2 Smart Modem for ZX81/TS1000 they should have another very fine product. Having trouble locating or using a modem for your ZX81 or TS2068 then give them a call, and tell 'em you read about it in **CTM**.

Chet, I can't seem to scrape up enough cash to get online with CompuServe, but have read some interesting comments about the Edwards Sig. Can't find an address for them Chet, do you have one or know of any other way I can contact them?

Got to go unload a truck right now to earn some more parts money. Look forward to your reply Chet.
sgd/Gary Hearn

Gary, it is always to hear from you eventhough it is in the form of a letter. They always contain good information for our readers.

As concerns the TI keyboard interfacing with your ZX81. I suggest you contact Robert D. Hartung, if you haven't already. And get him to help you with the conversion. I bet he will be more than happy to assist you with the conversion.

We have either recently or soon to be printed programs by P.C. Cothran on an electronic series similar to what you have there, I think. I am not sure but I think P.C.'s articles will run on both the Kaypro and T/S computers. I will be glad to see if they are different. If you can send them to me.

I don't mind going to a local BBS and download articles if I get exact instructions on how to do it. See my comments in the March/April issue on this.

Also in my March/April I covered the Basicode foreign broadcast and I have had a couple comments on that already. I would be interested in knowing someone who had downloaded these programs via shortwave. I think it would make an excellent article and I bet many of our readers would agree with me.

On the Oberon Omni-Reader. I haven't been contacted by Oberon at all eventhough I have called three times and send two letters.

I did see one at the Manufactures Computer Expo recently in Orlando and the people who had it was trying to get it to work with a KayPro II but couldn't get it to work. My first impression was that it was a toy. The quality was too impressive however, it may work fantastically if and when they got it to work, but as far as I know, they never did get it to work at the expo. I sure would like to get hold of one and see if it would work for me. I am willing to do anything I can to ease my workload.

I am not too sure I understand your question on the Edwards SIG. If you are referring to Paul and Sarah Edwards who did the series Computer Entrepreneurs in **CTM**, then the information is: CompuServe Information Service - Go HOM-146. Their ID is 76703.242. I hope this is the information you are asking about.

It sure was good in hearing from you. And I hope you are able to get the TI keyboard interfaced with your ZX81. Just as a matter of interest, did you get the TS1000 I sent you I got at the Atlanta Hamfest last June. I don't remember you ever saying? Take care and I hope you the best of luck. Chet

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3-24-85
Dear Sirs:
I'm interested in ham radio. I have a Ameco 2 and 6 meter transmitter, Model TX-62. I need crystals or a VFO for it. Also a manual on it, Can you help me in this area. Please send me your catalog and price list.
/sgdT.G. Troy
P.O. Box 782
Pahoa, HI 96778

Thanks for writing and your letter and it really brought back fond memories. I gave my French/American Ham Club in Everaux, France an Ameco TX62 in 1964. I wouldn't have any idea on where you might get xtals or VFO for such an old rig. Perhaps one or more of our readers will be able to assist you. I hope so. My TX62 gave me good service mobile.

I hope you are able to salvage the rig.
Sincerely and best 73, Chet

• • • • •

26 March 1985
Dear Chet,

It was nice seeing you and the two very pretty ladies at the Orlando Hamfest. Hope that you will continue to make it a stop on your busy schedule.

On the "new look" second edition... yuk or should I say YUK.

It has nothing to do with the contents or the intended "look" as number one was beeuutiful ... but as one printer to another this one needed a little more QC (Quality Control) on the part of your "printer".

My copy arrived this morning. Four signatures were not edge trimmed. Therefore am unable to open sixteen pages. No big deal as I can always use my pocket knife ... but several other signatures were miss-folded and the type is past the saddle. Other pages are end trimmed off the top and the same number are end trimmed off the bottom.

Several of the signatures show what we in the trade call "catch-up" and several pages show "plate scum". These two occur in the press room and are caused by lack of moisture or better known as "a pressman went to sleep".

One signature was folded on an angle, when inserted in magazine and trimmed it lost part of the print "on a bias".

All in all thru no fault of yours I have a magazine that I can not read or enjoy. it shows lack of proper quality control on the part of your printer. I sincerely hope that mine was one of a kind edition and may some day become very valuable ... but I doubt it on both counts. Would you be so kind os to send me another copy of the March/April 1985 issue ... so I will be able to read it, and use the program that is there ... except for several lines that the cutter got.
73's
sgd/Ted, W4LJB

Ted, thanks for your letter and by now you have read my "Chats" in this issue on the point of your letter. No, I am extremely unhappy to say, yours wasn't the only one. Boy, what a time I am having in trying to do something very worthwhile. I will be sending you and others another copy along with this issue. I hope this will be the last of the mass mix-ups for me. You can't imagine just how much trouble and work this has caused me. I hope this will be the last... 73, Chet

• • • • •

March 28, 1985
Thanx much, Chet,
for including the KBD and static precautions articles in the March/April **CTM**. I agree with Fred Blechman that with the quality support **CTM, TSH, SWN** and others are giving us, Ziff-Davis can eat their heart out for being so quick to abandon us T/S fanatics, as Tom Woods calls us.

By the way, Tom's Syncware News is very much alive and well. Also, his completed PRO/FILE 2068 manual is now in circulation. Even aside from this excellent data filing and retrieval program the manual is a masterpiece as a general T/S tutorial and example of how all computer manuals should be written.

My apologies for the fact that my use of the cursor-left (
) or "less-than-equal" character in the TI KBD ms. seems to have thrown a curve to your printer. As many printers do, it was apparently interpreted as a TAB command. Anyway, for the sake of any readers who might stumble over this one slight omission, the next to the last lines of the paragraph under the KBD picture should include"....M to K,
to L." I'll leave it to you to figure out how to get your printer to print this unprintable character without doing the same thing again!
sgd/Bob (Hartung)

Thanks Bob for letting us know of the omission from your TI KBD article. I think Gary Hearn will be contacting you for help in getting his going with his ZX81. See his letter above.

I know many of our readers enjoy your articles as stated in one or more of the letters above. Keep up the good articles and thanks much for your

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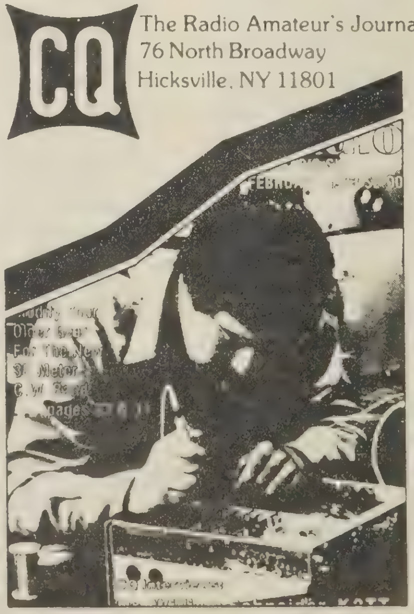

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Programs for the IBM PC, PCjr, and Compatibles

James J. Pittman, KA4PDZ

This article is about Wordstar, Version 3.3. In the months that follow, I will write several articles on things that you can do with Wordstar and several other Word Processor programs.

Wordstar was written by MicroPro and is the best known word processor program on the market today. After all these years, Wordstar is still the word processor to which all others are compared. Wordstar was designed to work with a maximum of 64K of memory, so if you aren't planning to put a memory expansion on your PCjr, then it is an excellent word processor to use.

There are several excellent books on the market on Wordstar, but be sure and get a book that specifies for IBM PC or PCjr. The book "Using the IBM Personal Computer: Wordstar", by C.J. Puotinen, printed by Holt, Rinehart and Winston is an excellent text for the beginner as well as the seasoned veteran. This book first takes you through information on your IBM PC in layman's terms that are easier to understand than your IBM manuals and doesn't take a degree to understand (IBM should take a leaf from C.J. Puotinen's book). the second chapter takes you through some of Wordstar's basic features and the third chapter explains about using DOS (Disk Operating System for you beginners out there). From there the book takes you through Wordstar as if you were
UND MNM!
e a beginner. But, this article isn't on the book, instead it is on the program.

When you first start using Wordstar, don't be intimidated by the number of commands available. You will notice the a "Ctrl S" (= Ctrl on screen) will move the cursor one character to the left, well you can still use your arrow-left key to move your cursor one character to the left. Remember that Wordstar was written for some systems that don't have arrow keys on the keyboard. Most users of Wordstar don't use more than about two to three dozen commands regularly and read any special commands from the menus provided.

Check you Wordstar diskette and make sure that the WINSTALL program is on your diskette. It is very important that you have this program, as you can customize Wordstar's Function keys to save you steps in your word processing. In this article I will explain the steps you will have to take in Wordstar to establish predetermined margins for all the documents you create.

1. Most people use only a few margin settings. Perhaps you will dictate one margin setting for letters, another for memos and one ot two more for reports.

The first step is to write those margin settings down on paper, like so:

letters: LM 4 RM 70 Tab at 10
memos: LM 10 RM 65 Tab at 15
report1: LM 12 RM 62 Tab at 17
report2: LM 17 RM 57 Tab at 22
table: same as letters, but tabs every 10 spaces

It doesn't particularly matter which margin settings you pick; simply make a decision based upon what you would normally make your documents look like using Wordstar or a typewriter.

2. The second step is to create a file that contains this information in a form that Wordstar can understand. Start up Wordstar in the usual manner (i.e., start DOS, load Wordstar). When shown the Wordstar main menu,

type D

to indicate that you wish to edit a document. When prompted, enter the name of the document you want to edit. For example:

type MRS (Return)

You created a document named MRS, which stands for "margin settings." The reason you only enter a three-character name is because that's all the characters you have room for when you turn this file into your automatic margin control utility. Wordstar informs you that this is a "New File," and presents its usual editing display.

3. Now you'll enter a line for each of the margin settings you wish to use in Wordstar (Figure 1). Each line will be entered just as it would look at the top of the Wordstar display if it were the current ruler indicator. The following characters are used in this ruler:

L indicates left margin
R indicates right margin
! indicates normal tab stops
- all other spaces within the margins

You'll create five lines, as shown in Figure 1, then save this document as follows:

type Ctrl KD/qc

4. You can use these new margin settings, but you can reduce the number of keystrokes for each change of margins even further.

To change margins in Wordstar, while editing a document:

type Ctrl KR MRS (Return)

to load in you margin setting lines. Move the cursor to the appropriate margin line and:

type Ctrl OF

to set the margins. Erase the ruler margin lines from your document (using Control Y, the erase line command). If your counting, that's a minimum of 13 keystrokes, which is still to many for simple tastes.

If you were to reinstall Wordstar and change the function key settings for F3 and F4 (currently CTRLOL(ESC) and CTRLOR(ESC), respectively) to CTRLKRMRS (ENTER) AND CTRLOF, you could eliminate six keystrokes. You could then change both margins and all tab settings with as few as seven keystrokes.

5. To change the function key definitions, follow the instructions MicroPro provides for installing Wordstar. To summarize, start up the computer using DOS. Put the installation disk in drive A and the copy of Wordstar you wish to install in drive B. Then:

type WINSTALL (Return)

Follow the instructions until you get to the menu that looks like Figure 2. To change these function keys:

type E

You'll be presented with a new menu of choices, from which you need to choose the one that indicates function keys (see Figure 3):

type S

6. The installation program now shows you the current settings of your function keys (see Figure 4). You want to change F3 and F4. Follow the prompts, and when asked for what F3 should be (see Figure 5A):

type Ctrl K

press Return

type R (Return)

type M (Return)

type A (Return)

type R (Return)

type ,0D (Return)

The last entry should be a comma, followed by a zero and the letter D.

7. Then change the name of the F3 label that appears at the bottom of the screen (see Figure 5B) to MARGIN or GETMRS or GETSET.

8. When asked for the definition for F4:

type Ctrl O (Return)

type F (Return)

type . (Return)

9. Last, change the name of the F4 function key to CHANGE or DOMRS or DOSET.

10. Follow the prompts out of the installation program (the X option on all but the last menu, where you'll press A) and save your modified Wordstar file.

11. You're now able to use your predetermined margin settings. Whenever you want to change your margins while you are in a Wordstar document, follow these steps:

press F3

Move your cursor to the appropriate margin line and:

press F4

Erase the margin lines (using the Ctrl Y function).

Now you will be able to change your function keys to any command that you would normally use and shorten down the number of keystrokes while you work. Next month I will compare Wordstar with Wordstar 2000. The copy of Wordstar that I used to write this review with was provided by:

Micro National
240 Oxmoor Circle, Suite 105
Birmingham, AL 35209
E. T. Brown, Manager
(205) 942-2822

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FROM PITTMAN Pg. 92

If you have any questions or trouble with the information I have given you in this article, write me and be sure to enclose a S.A.S.E. The address is:

James J. Pittman
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CTM

P.S. If you need any help with a program or have a program that you would like to know more about, please drop me a note. Until next month, Happy Word Processing!

James J. Pittman CTM

FROM LETTERS Pg. 89

dedicated efforts to the T/S family...

I also really enjoyed the other writing you sent me along in this letter. I think what you are doing is more than great. It too, is a labor of love and I know your rewards are building but I know that is your reason for doing it.

For your readers, Bob works with teenagers who need help with outside family counselling. Keep up the great work Bob and God Bless... Chet CTM

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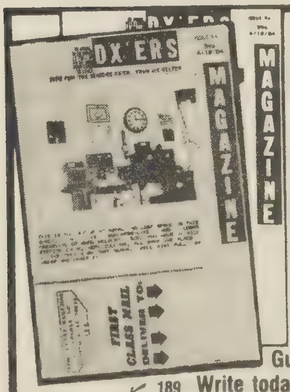

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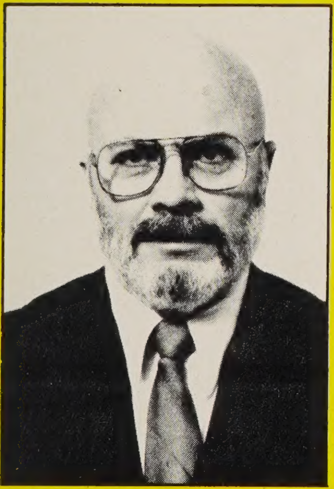

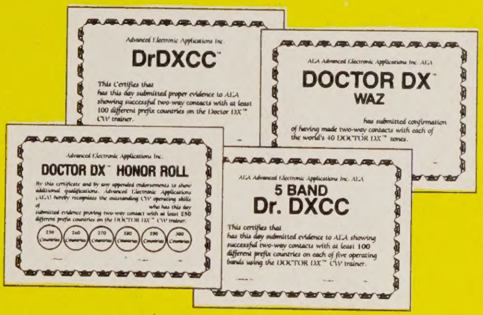

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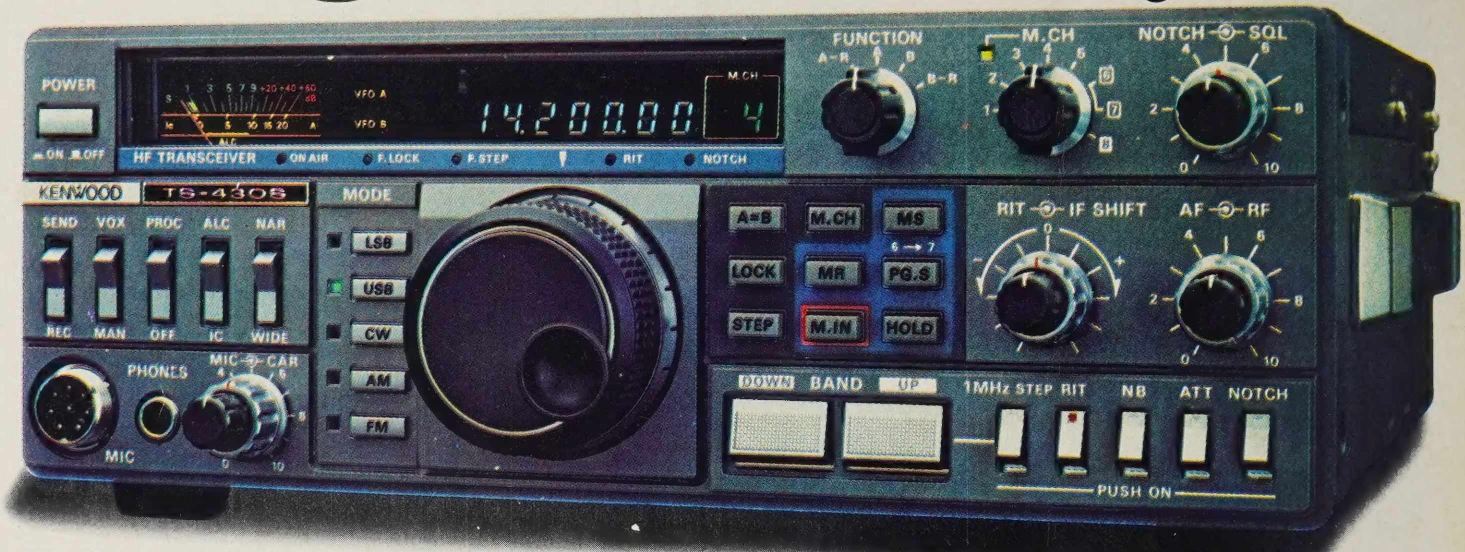

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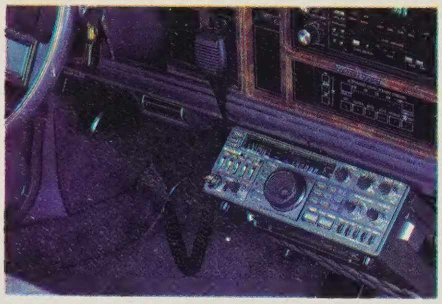

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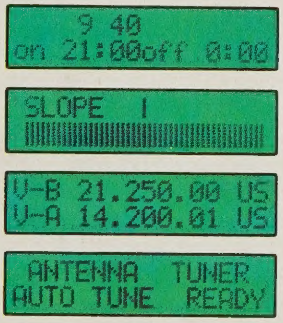

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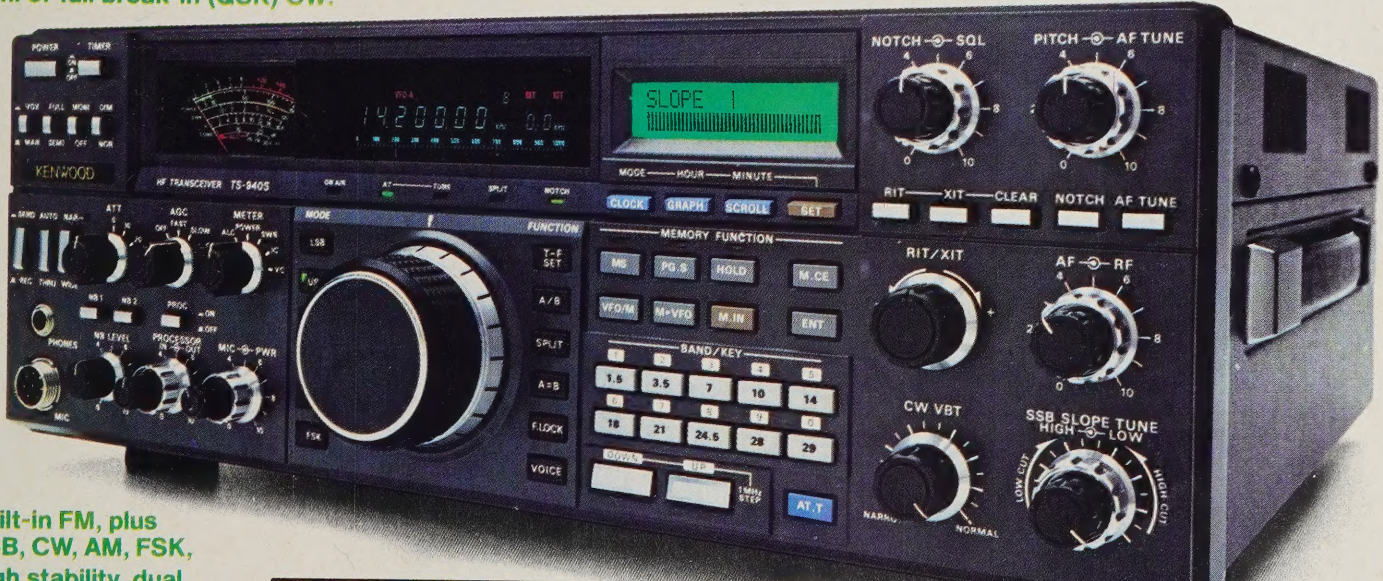

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